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DEPARTMENT OF THE INTERIOR

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ENVIRONMENTAL STATEMENT

PROPOSED DOMESTIC LIVESTOCK GRAZING MANAGEMENT PROGRAM FOR THE SEVEN LAKES AREA

Prepared by

BUREAU OF LAND MANAGEMENT

DEPARTMENT OF THE INTERIOR

State Director, Wyoming State Office

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SUMMARY

(X) Draft ( ) Final Environmental Statement

Department of the Interior, Bureau of Land Management-lead Agency

1. Type of Action: (X) Administrative ( ) Legislative

2. Brief Description of Action: The Seven Lakes ES area is situated 20 miles northwest of Rawlins, Wyoming, and encompasses 512,854 acres. Proposed use for the area is 54,869 winter sheep animal unit months (AUMs) for livestock: 1,325 winter sheep AUMs for wildlife; and 464 winter sheep AUMs for wild horses. The proposed action is to fully implement three allotment management plans (AMPs) on areas suitable for grazing within 5 years after completion of this ES. These AMPs would consist primarily of deferred rotation or deferred grazing systems for 15 livestock operators. Livestock rotation would be accomplished by fencing, herding, and selected water developments. This would require approximately 44 miles of allotment boundary fence and 36 water developments.

3. Summary of Environmental Impacts: Vegetation would improve in quality and quantity, providing increased litter and slight increases in vegetative cover. Approximately 230,000 additional acres would be made suitable for grazing cattle. Terrestrial wildlife habitat would remain stable or in improved condition. This would insure that present big game population objectives would be met. Slight increases in income would result from the proposed action.

   Adverse impacts would include trampling damage to some archeological sites. Aquatic and riparian wildlife habitat would remain stable or decrease in quality. Construction of range improvements could destroy subsurface archeological sites. Fences would increase the risk of mortality to pronghorn and wild horses. They would also limit the free-roaming character of the wild horses. Activation of all licensed livestock forage which is presently in nonuse would increase forage and cover competition between wildlife and livestock.

4. Alternatives Considered:
   1. No action;
   2. Elimination of livestock grazing;
   3. Implementation of the proposed action without fencing;
   4. Reduced licensed livestock use with additional consideration for wildlife crucial areas;
   5. Livestock grazing at the level of proposed action with no changes in class of livestock;
   6. The proposed action with additional fencing.

5. Comments have been requested from the following:

   See Attached

6. Date Draft Statement Made Available for E.P.A. and the Public:

Comments on the draft environmental statement will be requested from the following agencies and interest groups.

Federal Agencies
Environmental Protection Agency
National Advisory Council on Historic Preservation
Nuclear Regulatory Commission

Department of Agriculture
- U. S. Forest Service
- Soil Conservation Service

Department of the Interior
- U. S. Fish and Wildlife Service
- Heritage Conservation and Recreation Service
- Bureau of Mines
- National Park Service
- Bureau of Reclamation
- U. S. Geological Survey

State Agencies
- Governor's Clearing House (Distributes to State Agencies)

Local Government
- Mayor of Rawlins
- Carbon, Fremont, and Sweetwater County Commissioners and Planning and Zoning Commissions

Other Organizations
Natural Resources Defense Council (NRDC)
Public Lands Council
Wyoming Stockgrowers Association
Wyoming Woolgrowers Association
The Wildlife Society, Wyoming Chapter
Sierra Club
Old West Rangeland Monitoring Project
Wild Horse Organized Assistance, Inc. (WHOA)
Wyoming Wildlife Federation
Friends of the Earth
Wyoming Outdoor Council
Carbon County Conservation Club
Fremont County Audubon Society
National Audubon Society
Izaak Walton League
Council for Agricultural Science and Technology (CAST)
Wilderness Society
Defenders of Wildlife
Wyoming Historical Society
Wyoming Farm Bureau
American Horse Protection Association
Carbon County Farm Bureau
University of Wyoming
International Society for the Protection of Mustangs and Burros
Carbon County Extension Service
Society for Range Management
National Wildlife Federation
American Sheep Producers
National Mustang Association
National Wild Horse Association

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CHAPTER 1

DESCRIPTION OF THE PROPOSED ACTION

BACKGROUND

This environmental statement for livestock grazing management has been prepared in compliance with Section 102(2)(C) of the National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et. seq., which requires analysis of environmental effects of domestic livestock grazing on public lands under the jurisdiction of the Bureau of Land Management (BLM).

The ES area (Figure 1-1) is located within the nationally known Red Desert and helps support the nation's largest migratory herd of pronghorn (personal communication Wyoming Game and Fish Department). Approximately 95% (490,000 acres) is within the Great Divide Basin of Wyoming. The ES area is generally undeveloped. Developments consist primarily of limited range improvements, roads, and mineral extraction facilities. Access is mainly on unmaintained trails and roads.

The boundary of the Seven Lakes ES area conforms to the boundary of the Seven Lakes Planning Unit of the Divide Resource Area with one major exception. The Arapahoe Creek allotment (181,660 acres) was omitted because Green Mountain livestock operators have historically used this portion of the Seven Lakes Planning Unit in conjunction with the Green Mountain Unit; therefore, the Arapahoe Creek allotment will be included in the forthcoming Green Mountain Grazing Environmental Statement (Map 2-19). Both the Divide Resource Area and the Green Mountain Unit area part of the Rawlins District.

The use of the area has been changing over the last 20 years as the nation's energy demands have prompted petroleum and uranium exploration and development. While this activity is evident in most portions of the Seven Lakes ES area, it has not dominated the open space qualities inherent to the basin.

The history of livestock use in the ES area focuses on sheep grazing. However, sheep use is declining (Table 1-1 and Figure 1-2) and many livestock operators have expressed a desire to convert sheep use qualifications to cattle use. The requested conversions from sheep to cattle have not been allowed by BLM, pending a full assessment of the environmental impacts. Seven out of fifteen operators in the Seven Lakes ES area have requested changes of use through personal meetings, letters, or public meetings. All requests have been made formally, in writing, to the Divide Resource Area, Rawlins District Office, Rawlins, Wyoming.

Currently the Seven Lakes ES area is divided into two incommon allotments, the Seven Lakes allotment and the Ferris allotment (Map 2-19). The ES area contains 512,854 acres and is 94% public land (Table 1-2 and Map 1-1). BLM's policy is to manage the public land for multiple use. Present uses and values, in addition to domestic livestock grazing, include: use by about 3,800 winter pronghorn and 1,845 summer pronghorn; use by 240 wild horses year-round; use by 175 mule deer year-round; recreational use consisting primarily of hunting; and considerable petroleum and uranium production and exploration.

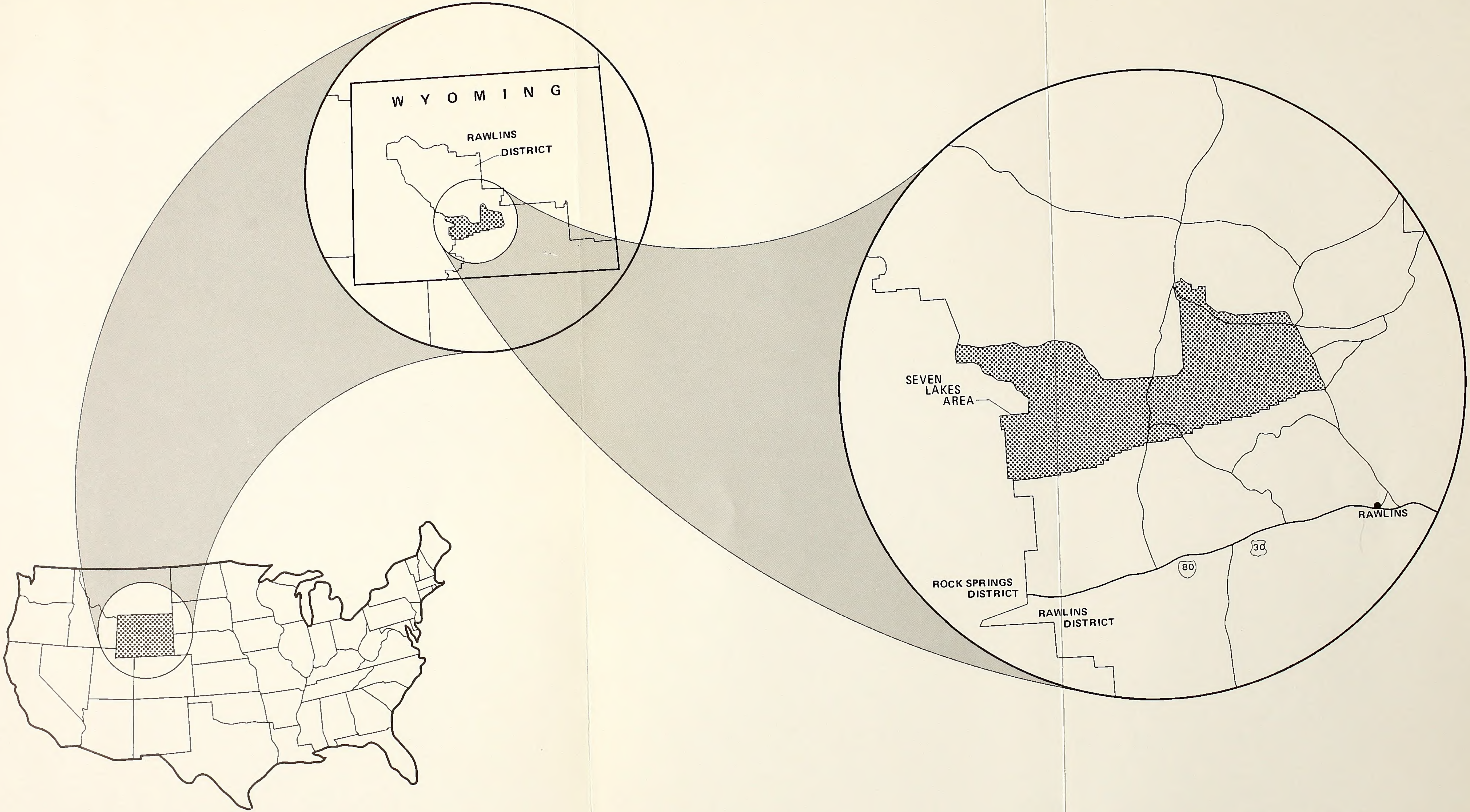
PROPOSED ACTION

General

The proposed action by the BLM is to implement a program of improved livestock grazing management in the Seven Lakes ES area. The proposed improved livestock grazing program would change the existing grazing use, which is described in Chapter 2. Table 1-3 provides a summary comparison of the proposed action with the existing situation for the ES area.

Under the proposed action, the Seven Lakes ES area would be divided into three separate grazing areas (allotments), i.e., the two existing incommon allotments would be divided into these allotments (Ferris, Stewart Creek and Cyclone Rim). An allotment management plan (AMP) for each area would be implemented to improve or maintain the forage, watershed, soil conditions, wildlife habitat, and/or recreational values. The Cyclone Rim allotment is proposed primarily as a winter use area for both sheep and cattle. The Ferris allotment is proposed as a winter sheep and summer cattle area, and the Stewart Creek allotment is designed mainly for summer cattle use. The proposed allotments are shown on Map 1-1 and in Table 1-2.

The purposes of the proposed action would be: (1) to supply 464 winter sheep animal unit months (AUMs) (see Appendix B-2-7) of forage for wild horses in accordance with the draft Seven Lakes Herd Management Area Plan (HMAP), which plans for a maximum of 135 wild horses in the ES area; (2) to furnish 3,434 winter sheep AUMs of forage for wildlife (Table 1-4 states that 1,325 AUMs are proposed to be used by mule deer and pronghorn; the difference between 3,434 and 1,325 is the number of AUMs furnished but not initially used by mule deer and pronghorn): (3) to make 81,926 acres suitable for summer cattle use and 149,416 acres suitable for winter cattle use which are presently unsuitable because of a lack of water and low vegetative production; (4) to enable seven live-



GENERAL LOCATION

Seven Lakes Grazing

Environmental Statement

Figure 1 - 1

TABLE 1-1
PAST AUTHORIZED LIVESTOCK USE
(Expressed in Animal Unit Months--AUMs)*

Seven Lakes Incommon Allotment

	Sheep			Cattle		
Year	Active	Nonuse	Percent Nonuse	Active	Nonuse	Percent Nonuse
1972	18,786	34,698	64.8	7,829	2,810	26.4
1973	18,646	34,838	65.1	6,206	4,433	41.6
1974	17,002	36,482	68.2	8,875	1,764	16.5
1975	18,997	34,323	64.3	8,506	2,133	20.0
1976	17,076	35,451	67.5	8,948	2,448	21.5
Average	18,101	35,158	66.0	8,073	2,718	25.2

Ferris Incommon Allotment

	Sheep			Cattle		
Year	Active	Nonuse	Percent Nonuse	Active	Nonuse	Percent Nonuse
1972	2,969	2,660	47.2	176	0	0
1973	4,431	1,198	21.2	176	0	0
1974	3,632	1,997	35.4	176	0	0
1975	3,082	2,547	45.2	176	0	0
1976	2,563	2,901	53.0	341	0	0
Average	3,335	2,261	40.4	209	0	0

The above figures represent licensed active use and nonuse of federal grazing privileges. Some 93% of the livestock AUMs in the Seven Lakes incommon allotment are federal, and 88% of the AUMs in the Ferris incommon allotment are federal.

The Table 1-1 figures were derived from the actual licensed use from 1972-1976, based on two incommon allotments, which have more acreage than the ES area, i.e., the figures include use on the Arapahoe Creek allotment which has been excluded from the Seven Lakes incommon allotment of the ES area. Active use for the ES area is estimated to be 26,105 AUMs (Appendix B-2-15 & B-1-3).

*An animal unit month (AUM) is the amount of forage required to sustain the equivalent of one cow or five sheep for one month.

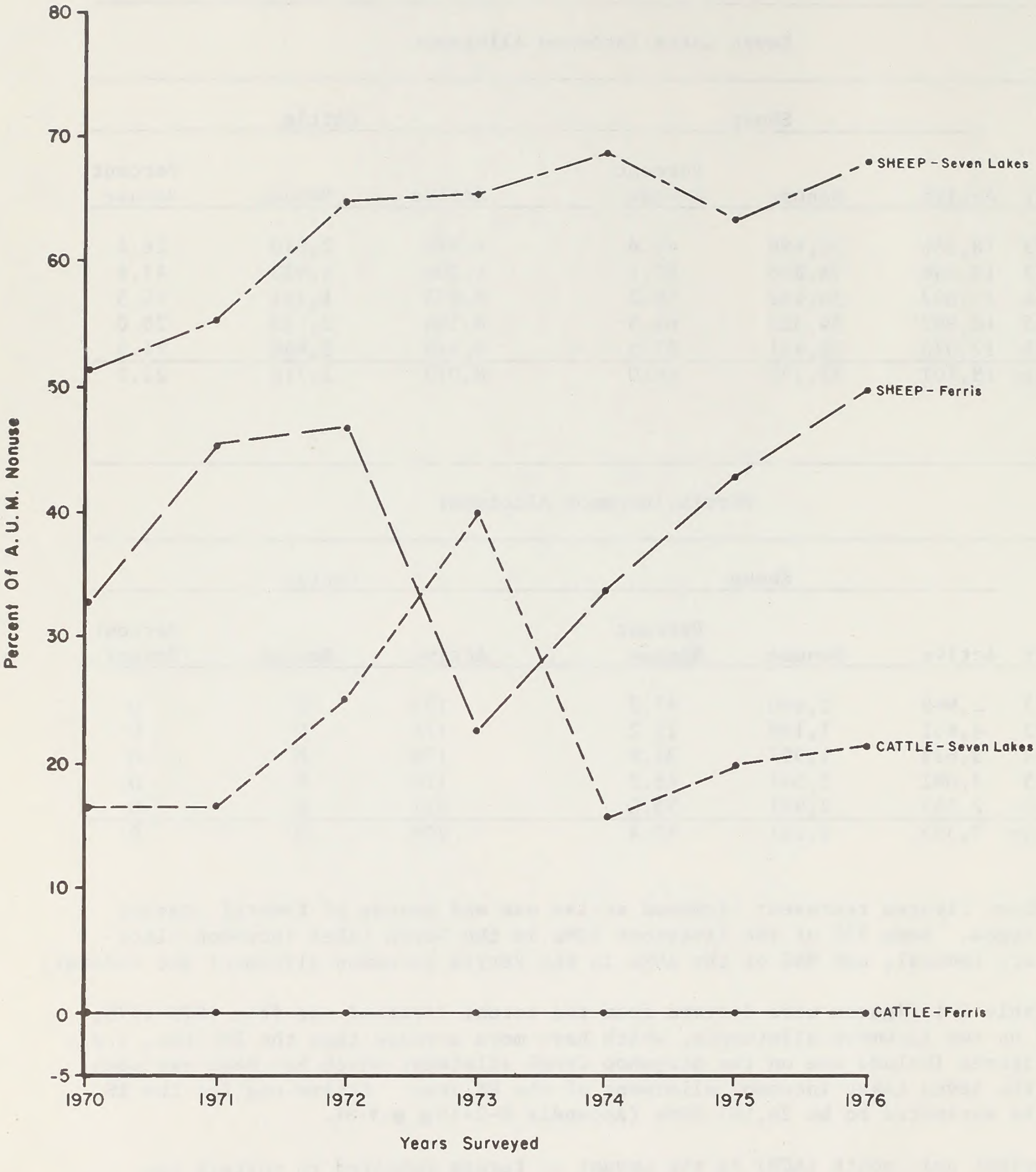
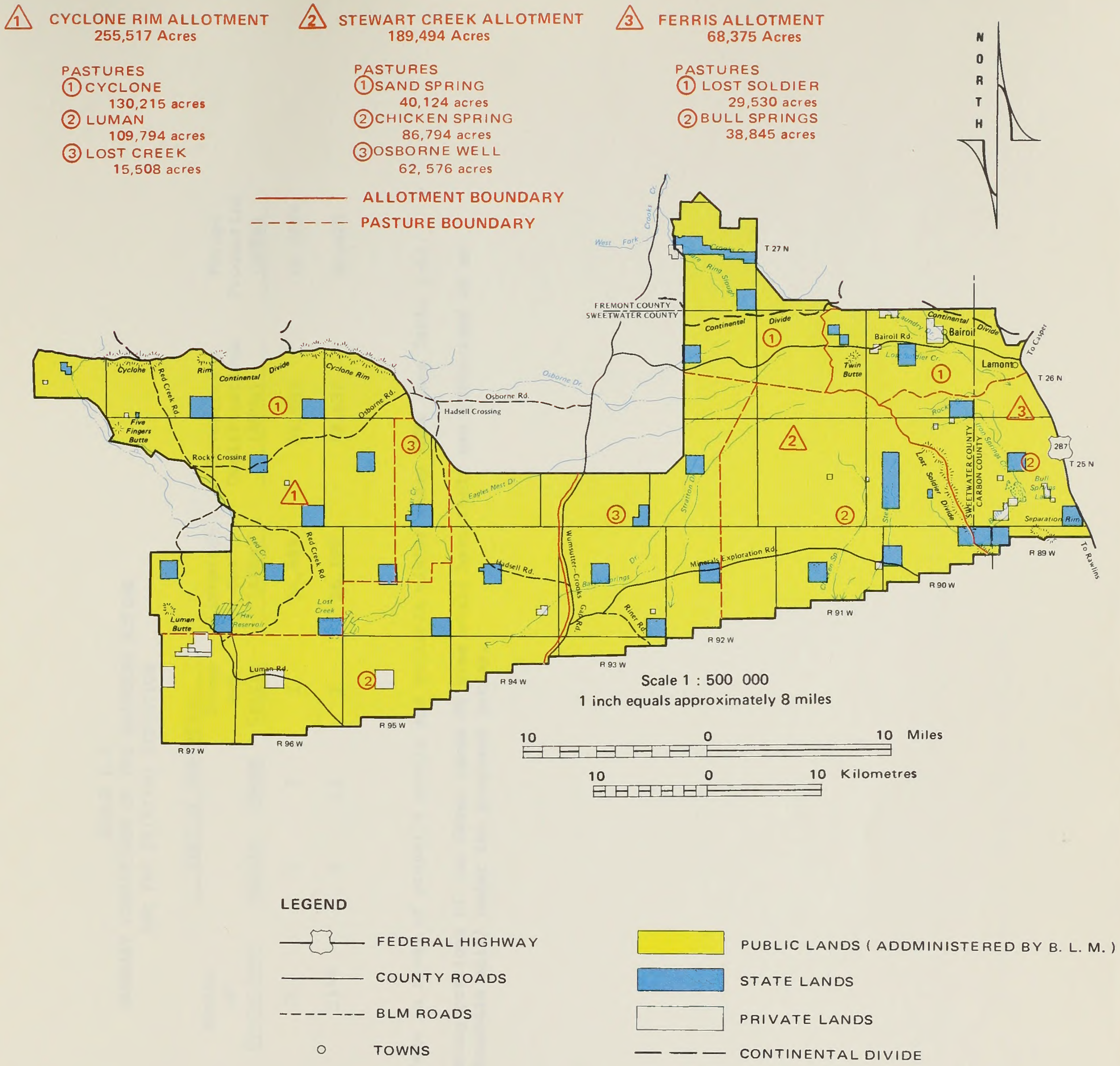


Figure 1 - 2

NONUSE TRENDS FOR LIVESTOCK
IN THE SEVEN LAKES E.S. AREA

TABLE 1-2
ACREAGES OF THE THREE PROPOSED GRAZING ALLOTMENTS
IN THE SEVEN LAKES ES AREA

Allotment	Public Land	%	State	%	Private	%	Total
Ferris	61,284	90	4,935	7	2,126	3	68,345
Stewart Creek	178,932	95	9,891	5	168	1	188,991
Cyclone Rim	243,424	95	11,250	4	844	<1	255,518
Total	483,640	94	26,076	5	3,138	<1	512,854



LAND STATUS BY

PROPOSED ALLOTMENT AND PASTURE

Seven Lakes Grazing

Environmental Statement

Map 1 - 1

TABLE 1-3
SUMMARY COMPARISON OF THE PROPOSED ACTION AND THE EXISTING SITUATION

	Number of Allotments	Number of Operations	Type of Operation			Livestock Use (AUMs)	Livestock Qualifications (AUMs)	Forage Production (AUMs)
			Cattle	Sheep	Sheep and Cattle			
Proposed Action	3	15	6	7	2	54,869	54,869	64,707*
Existing Situation	2	21**	6	13	2	26,105	58,687	60,620

*Long-term (1998) production of forage in terms of properly usable and suitable winter sheep AUMs (see Table 3-6).

**Six cattle operations presently using portions of the Seven Lakes ES area would have their use authorized in an adjacent area to the north (Green Mountain unit) under the proposed action.

TABLE 1-4
PROPOSED FORAGE USE BY ALLOTMENT

Allotment (& Acreage)	Grazing System	Class of Livestock/ Species	Season of Use[1]	Number of Animals[2]	AUMs[3] Public	AUMs[3] State	AUMs[3] Private	Total AUMs	Total lbs. of Forage use[4]
Ferris (68,345)	two-pasture deferred rotation	cattle[5]	5/15 - 10/15	98	884	110	19	1,013	382,200
	seasonal	sheep	11/1 - 3/31	3,882	3,591	239	52	3,882	1,746,900
		mule deer[6]	yearlong	25	11			11	108,000
		wild horse[7]	yearlong	21	72			72	226,800
		pronghorn[8]	5/1 - 10/31	360	71			71	116,640
		pronghorn	11/1 - 4/30	1,000	197			197	324,000
Allotment Total					4,826	349	71	5,246	2,904,540
Stewart Creek (188,991)	three-pasture deferred rotation	cattle	5/20 - 10/31	1,125	9,750	501	9	10,260	4,679,971
	seasonal	sheep	11/1 - 3/31	6,166	6,081	78	7	6,166	2,774,700
		mule deer	yearlong	75	31			31	324,000
		wild horse	yearlong	57	196			196	615,600
		pronghorn	5/1 - 10/31	490	97			97	158,760
		pronghorn	11/1 - 4/30	2,000	395			395	648,000
Allotment Total					16,550	579	16	17,145	9,201,031

TABLE 1-4 (CONTINUED)
PROPOSED FORAGE USE BY ALLOTMENT

Allotment (& Acreage)	Grazing System	Class of Livestock/ Species	Season of Use[1]	Number of Animals[2]	AUMs[3] Public	State	Private	Total AUMs	Total lbs. of Forage Use[4]
Cyclone Rim (255,518)	three-pasture seasonal discontinuous	cattle[5]	10/1 - 3/31	934	7,716	188		7,904	4,371,120
	three-pasture seasonal discontinuous	sheep	11/1 3/31	23,909	22,587	1,305	17	23,909	10,759,050
	one-pasture seasonal	sheep	5/1 - 7/15	1,836	1,735			1,735	688,500
		mule deer[6]	yearlong	75	32			32	324,000
		wild horse[7]	yearlong	57	196			196	615,600
		pronghorn[8]	5/1 - 10/31	489	96			96	158,436
		pronghorn	11/1 - 4/30	2,000	395			395	648,000
Allotment Total					32,757	1,493	17	34,267	17,564,706
GRAND TOTAL					54,133	2,421	104	56,658	29,670,277

1 Season of Use--Period of time livestock would use each allotment under the proposed action.
2 Livestock use after development of range improvements (fences, water, etc.) (5 years).
3 Total proposed livestock use on public, state, and private lands included in the proposed action (see Table 1-2). Use on state and private lands would be authorized by exchange-of-use agreement. All use in AUMs expressed on a winter sheep basis (see Appendices B-2-7 and B-1-1).
4 Total forage use is calculated by multiplying the number of months a class of animal is on the range by the number of animals and then multiplying that product by the pounds of forage consumed by that class of animal in a month.
5 One cow consumes 780 pounds of forage per month and one sheep consumes 150 pounds per month in summer and 90 pounds per month in the winter (Rice 1975).
6 A mule deer consumes 360 pounds of forage per month (Rue 1968).
7 A wild horse consumes 900 pounds of forage per month (Rice 1975).
8 A pronghorn consumes 54 pounds of forage per month (Severson, May, and Hepworth 1968).

stock operators to change their class of livestock from sheep to cattle; (5) to eliminate livestock use on 4 acres of waterfowl habitat; and (6) to authorize 54,869 AUMs (on a winter sheep basis) of livestock forage consumption for sheep and cattle upon full implementation of AMPs. Table 1-4 shows proposed use levels by livestock, wild horses, and big game in the ES area upon AMP implementation. The methodology used to determine forage production is described in Appendix B-2-7.

Allotment Management Plans

The AMPs would be implemented on the three allotments over a 5 year period. The draft AMPs, which document the grazing management proposals for each allotment, are available for review in the Rawlins District Office. Each plan includes: (1) a brief description of the location and character of the allotment; (2) a list of the management framework plan (MFP) constraints and resource problems to be addressed; (3) a list of objectives to be accomplished by livestock management; (4) identification of key areas and their vegetative composition; (5) a list of key vegetative species and their important phenological dates; (6) a description of the proposed grazing systems, including grazing use authorization; (7) provision for changes in authorized use; (8) a description of licensing and billing procedures; (9) a description of the studies to be made to monitor use and evaluate the plan; and (10) a schedule of range project development. Each AMP was prepared following a review and analysis of resource data, a review of management framework plan (MFP) decisions, and meetings with livestock operators.

Prior to AMP design, BLM developed proposed seasons of use and proper livestock grazing capacity for each of the three allotments and proposed forage allocations for wildlife and wild horses in each allotment. Table 1-4 depicts the proposed use on each allotment by livestock, wildlife and wild horses. Table 1-4a provides a summary of the proposed use as compared to present forage production. The livestock use proposed is derived by applying suitability criteria (Appendix B-1-4) to the results of the 1975-1976 weight estimate forage survey of the Seven Lakes Planning Unit (available for review in Rawlins District Office).

Forage for wild horses is reserved in accordance with MFP decisions and the draft Seven Lakes HMAP. The draft HMAP calls for the mangement of a maximum of 135 horses. Forage for wildlife is reserved as detailed in Appendix B-1-1. The remaining suitable, properly usable forage is allocated to fifteen existing livestock operators in the area in proportion to their present grazing privileges. The proposed livestock forage allocations represent reductions from the existing allocations of 27.5% (1,871 AUMs) in the Ferris incommon allotment and 8.2% (5,582 AUMs) in the Seven Lakes incommon allotment.

The proposed action includes dividing a portion of the existing Seven Lakes incommon allotment into the Stewart Creek and Cyclone Rim allotments as well as adding a portion of the existing Green Mountain incommon allotment to the Stewart Creek allotment. Livestock drift is proposed to be controlled by a fence on the north boundary of the Cyclone Rim and Stewart Creek allotments. The boundary and users of the Ferris allotment would remain unchanged from the existing situation.

Change in class of livestock is provided for in each of the draft AMPs. Conversion ratios are established for each allotment (see Appendix B-1-1), based upon the suitable, properly usable forage available for each class of livestock in each allotment.

A benefit/cost analysis was conducted on each draft AMP. Results of the analyses are in Table 1-5. The benefit/cost studies and the methodology used are available for review at the Rawlins District Office.

Specific Objectives

The AMPs would guide the management of the Ferris, Stewart Creek, and Cyclone Rim allotments. Table 1-6 lists the specific objectives of each AMP.

Grazing Management

Grazing systems are accepted methods of proper rangeland management. The following statements by Stoddart, Smith, and Box (1975) reflect the thoughts of many range management specialists:

"Range forage is one of the most important resources for meeting the red meat requirements of the world's human population. In the past it has been exploited through heavy, uncontrolled grazing. Today there are principles of scientific management that can be applied to improve the range resource and insure a sustained yield of goods and services from rangeland. In order to apply these principles, grazing must be planned and the plan executed. Several planned-grazing systems are available to improve range productivity.

"The first consideration in planning range use is to ensure that the basic plant and soil resources are used in such a way that they continue to be productive under the grazing system employed.

"The selection of a particular system will depend upon the kind of vegetation, the physiography of the range, the kind of animals, and the management objectives of the operator.

"Continuous grazing wherein livestock are placed on the range and allowed to remain yearlong or throughout the grazing season has been shown to result in undesirable successional changes in range forage. To prevent this, specialized systems of grazing management have been used widely. Although differing greatly in details, they have two features in common, a period of rest to allow forage plants to grow unmolested and a systematic grazing schedule among different parts of the range.

"The objectives sought are (1) restoring vigor to forage plants, (2) allowing plants to produce seed, (3) attaining heavier and more uniform utilization, and (4) increasing animal production."

Studies of grazing systems conducted by Johnson (1965), Ratliff and Reppert (1974), and Hormay (1970)

TABLE 1-4a
COMPARISON OF PROPOSED USE TO PRESENT FORAGE PRODUCTION [1/]

	Proposed Use in AUMs					
Allotment	Sheep	Cattle	Wildlife	Wild Horses	Total Use	Present Forage Production in AUMs
Ferris	3,882	1,013	279	72	5,246	5,625
Stewart Creek	6,166	10,260	523	196	17,145	19,710
Cyclone Rim	25,644	7,904	523	196	34,267	35,285
TOTAL	35,692	19,177	1,325	464	56,658	60,620

[1/] All use and production figures are expressed as winter sheep AUMs (see Appendices B-1-1 and B-2-7).

TABLE 1-5
BENEFIT/COST ANALYSES OF DRAFT ALLOTMENT MANAGEMENT PLANS

Allotments	B/C Ratio
Ferris	.84:1
Stewart Creek	1.07:1
Cyclone Rim	1.26:1

Each benefit/cost ratio shown above is a ratio of the increase in revenue from the proposed action over the present situation which would be produced over the 20-year analysis period (discounted to present value) over a similar increase in costs. That is, for every dollar of increased costs associated with the proposed action, an $ .84 increase in revenue would be obtained for the Ferris allotment.

TABLE 1-6
AMP OBJECTIVES BY ALLOTMENT

Ferris	Stewart Creek	Cyclone Rim
1. Increase properly usable livestock AUMs (winter sheep basis--Appendix B-2-7) on all lands in the allotment from 4,828 to 5,652 within 15 years by implementing improved grazing management.	1. Increase properly usable livestock AUMs (winter sheep basis) on all lands in the allotment from 18,558 to 20,332 within 15 years by implementing improved grazing management.	1. Increase properly usable livestock AUMs (winter sheep basis) on all lands in the allotment from 33,336 to 41,452 within 15 years by implementing improved grazing management.
2. Continue to provide 725 AUMs of forage (winter sheep basis) for wildlife.	2. Continue to provide 956 AUMs of forage (winter sheep basis) for wildlife.	2. Continue to provide 1,753 AUMs of forage (winter sheep basis) for wildlife.**
3. Continue to provide 72 AUMs of forage (winter sheep basis) for wild horses.	3. Continue to provide 196 AUMs of forage (winter sheep basis) for wild horses.	3. Continue to provide 196 AUMs of forage (winter sheep basis) for wild horses.
4. Increase vegetative cover through livestock management in two key areas*** (study sites to monitor management results) from: 1) 21% to 30% 2) 16% to 20%	4. Increase vegetative cover 10% in the Sand Spring and Chicken Spring pastures and 20% in the Osborne Well pasture.	4. Increase vegetative cover through Livestock management in five key areas from: 1) 40% to 61% 2) 27% to 61% 3) 36% to 45% 4) 31% to 34% 5) 49% to 59%
	5. Increase the relative percentages of the identified key species (Table 1-7) by 5% in the key areas within 15 years of full implementation of the AMP.	5. Improve 70% of the acreage that is now in poor range condition for cattle and sheep to fair condition within 15 years of full implementation of the AMP.
	6. Lower the SSF* values in the key areas by 10% within 15 years of full implementation of the AMP.	

TABLE 1-6 (CONTINUED)
AMP OBJECTIVES BY ALLOTMENT

*SSF: Soil Surface Factor, a number from 1 to 100 that indicates the erodibility of a site - the greater the number, the greater the erodibility.
**The proposed reservation of AUMs of forage for wildlife in the AMP objectives for the three allotments total 3,434. The proposed use by wildlife in Table 1-3 is 1,325 AUMs. The two figures are not the same because one is proposed use, i.e., the forage initially required by existing populations; and the other is the proposed reservation, i.e., the total allocated forage.
***A key area is a portion of range, which, because of its location, grazing or browsing value, and/or use, serves as an indicative sample of range conditions, trend, or degree of use seasonally.

support the anticipated results of proper rest and systematic grazing.

Stoddart, Smith, and Box (1975) concluded, "Despite their disadvantages, proper deferred-rotation and rest-rotation schemes offer the range manager one of the most important tools in obtaining sustained productivity from rangelands."

To accomplish the specific objectives outlined in Table 1-6, each draft AMP proposes a grazing system including some form of deferment, rotation, and/or seasonal discontinuous grazing. Under the grazing system, each allotment would be divided into two or more grazing pastures which would be grazed by livestock or deferred from livestock use in a prescribed manner designed to accomplish the objectives.

The selection of the specific proposed grazing system to be applied to each of the three allotments was based upon several factors: (1) the effects of livestock grazing and livestock management facilities (fences and water developments) upon all the resources of the area; (2) simplicity (i.e., minimizing the number of pastures and livestock handling). Complex systems were simplified during planning because they require extensive fencing, which conflicts with other uses, or require excessive expenditure of time and money on livestock control by livestock operators; (3) range suitability for different kinds of livestock based upon the 1975-1976 Seven Lakes weight estimate range survey; (4) the needs and wishes of the livestock operators if they do not seriously conflict with resource values. The season of use in each allotment was determined by the physiology of the key range plants (specifically, the plants' needs for rest from grazing during early growth stages), and by the livestock operator's need to coordinate livestock grazing on public land with grazing on other federal, state or private land.

Under the proposed action, deferred systems would be used on two allotments (Ferris and Stewart Creek), affecting 257,336 acres and 22,391 AUMs (Table 1-7). Deferred grazing systems postpone grazing on alternating pastures until after seedripe time of most key forage species (Table 1-8), allowing the forage plants in these allotments an opportunity to complete growth and reproductive processes.

The Cyclone Rim allotment would have a seasonal discontinuous system that would affect 255,518 acres and 34,267 AUMs. Summer sheep grazing would account for 1,735 AUMs (Table 1-4). The remainder of the livestock use (31,813 AUMs) would be winter cattle and sheep use. The light grazing use during the growing season is designed to allow the key forage species to complete growth and reproductive processes.

Grazing Treatments. Seven grazing treatments (A through G) are proposed. Figure 1-3 shows grazing treatments by pasture through one complete grazing cycle. Table 1-8 describes the phenology of key forage species in each allotment.

Treatment A. Graze from May 1 until Seedripe of Key Species (August 1), Then Rest until Winter Grazing. Cattle movement would be controlled by topography, placement of water facilites, partial allotment boundary fences, and herding. Sheep movement would be controlled by herding. Sheep bands would be required to be moved at least every 7 days a minimum distance of 1½ miles in the Ferris and Stewart Creek allotments and 3 miles in the Cyclone Rim allotment. The minimum distance is determined by computing the radius of an area of a given grazing capacity that would be properly grazed in 7 days by a band of sheep. The minimum distance the band must be moved is twice that radius, and thus assures that the same area would not receive continuous use.

Treatment B. Rest until Seedripe of Key Species (August 1), Then Graze to Trample Seed into Soil until October 31. This treatment would defer grazing in a pasture until the important range plants have produced mature seeds.

Treatment C. Graze Season-Long Through the Winter (November 1-March 31). This treatment would be used with sheep, which would be moved as described in treatment A.

Treatment D. Graze Season-Long Through the Summer (May 20-October 31).

Treatment E. Graze October 1 Through January 15. This treatment would be used with cattle and sheep. The sheep would be moved as described in treatment A.

Treatment F. Rest Yearlong. Under this treatment, the pasture would not be grazed during the year.

Treatment G. Graze During the Period December 15 Through March 31. This treatment would be used with sheep and cattle, which would be moved and controlled as described in treatment A.

Table 1-9 shows the treatments given each pasture through one complete cycle of the grazing systems. Table 1-10 shows the acreage subjected to each grazing treatment through one complete cycle.

Grazing Systems. The seven grazing treatments are put together in various combinations to form grazing systems. The grazing system proposed for each allotment is determined by applying the factors discussed earlier in the Grazing Management section.

In the Ferris allotment, the proposed grazing system would be a two-pasture deferred-rotation system with season-long winter sheep grazing. Under this system, the allotment would be divided into two pastures of nearly equal carrying capacity. Cattle would be grazed the first year in Bull Spring pasture from the beginning of the season (May 15) until seedripe of the key forage species (August 1). All cattle would then be moved into Lost Soldier pasture, which would be grazed for the remainder of the summer season (August 1 through October 15). Bull Spring pasture would be rested from August 1 to October 31. Sheep would be grazed in both pastures throughout the winter season (November 1 through March 31). In the second year in the Ferris allotment, cattle would be grazed in the Lost Soldier pasture from May 15 through July 31. They would all be moved to the Bull Spring pasture to graze from August 1 through October 15. Sheep would be grazed in both pastures throughout the winter season. The two-year cycle would be repeated beginning in the third year.

The proposed Stewart Creek allotment grazing system would be a three-pasture deferred-rotation grazing system with season-long winter sheep grazing in two pas-

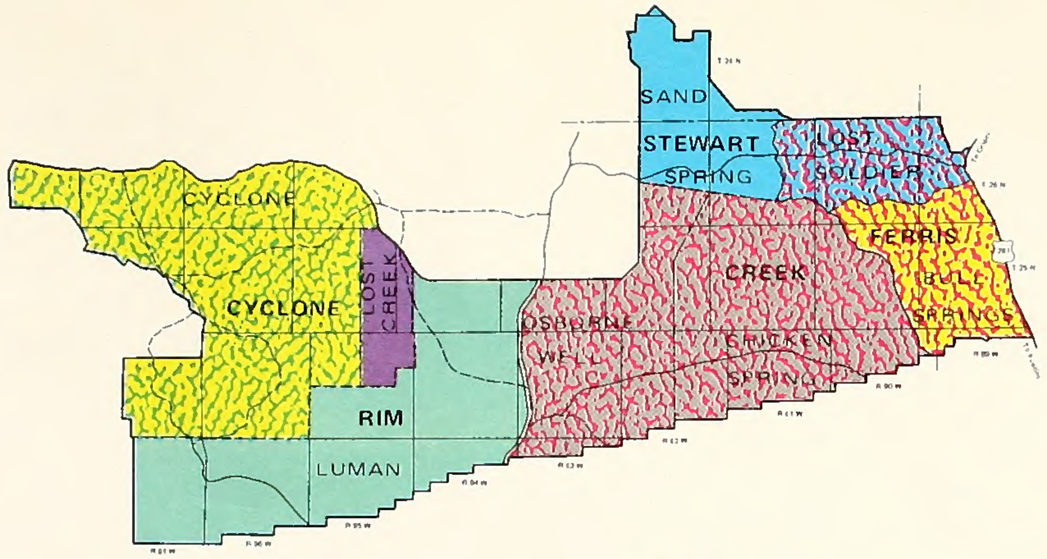
TABLE 1-7
SUMMARY OF PROPOSED GRAZING SYSTEMS

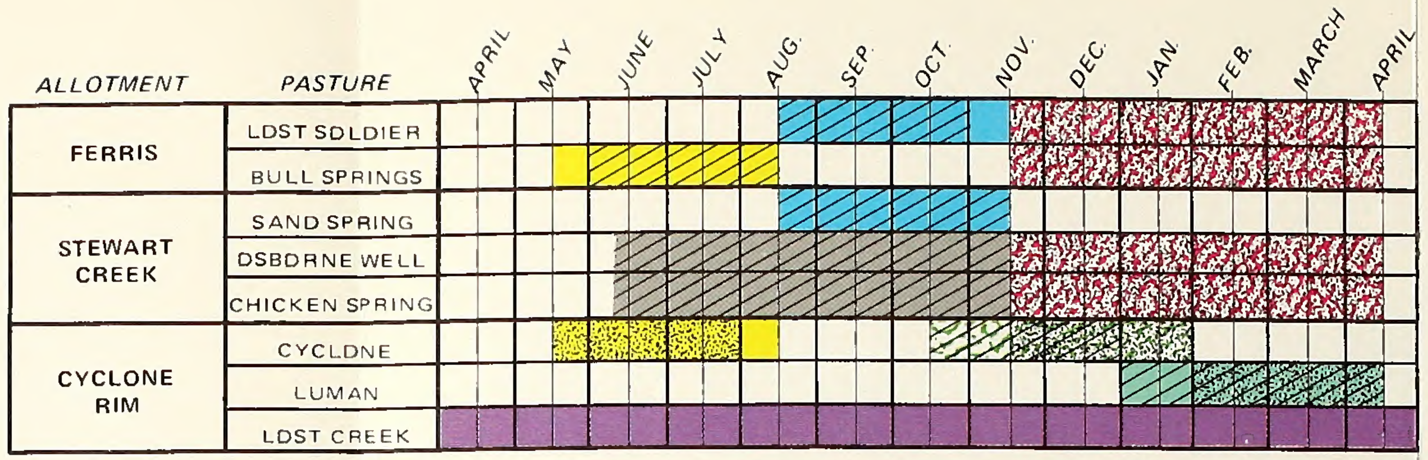
Grazing System	Allotments	Total AUMs*	Total Acres in Allotment
Deferred rotation			
Two-pasture	Ferris	5,246	68,345
Three-pasture	Stewart Creek	17,145	188,991
Subtotal		22,391	257,336
Seasonal discontinuous			
Three-pasture	Cyclone Rim	34,267	255,518
Total		56,658	512,854

*AUMs proposed to be used by livestock, wild horses, and big game species, expressed on a winter sheep basis (see Appendix B-2-7).

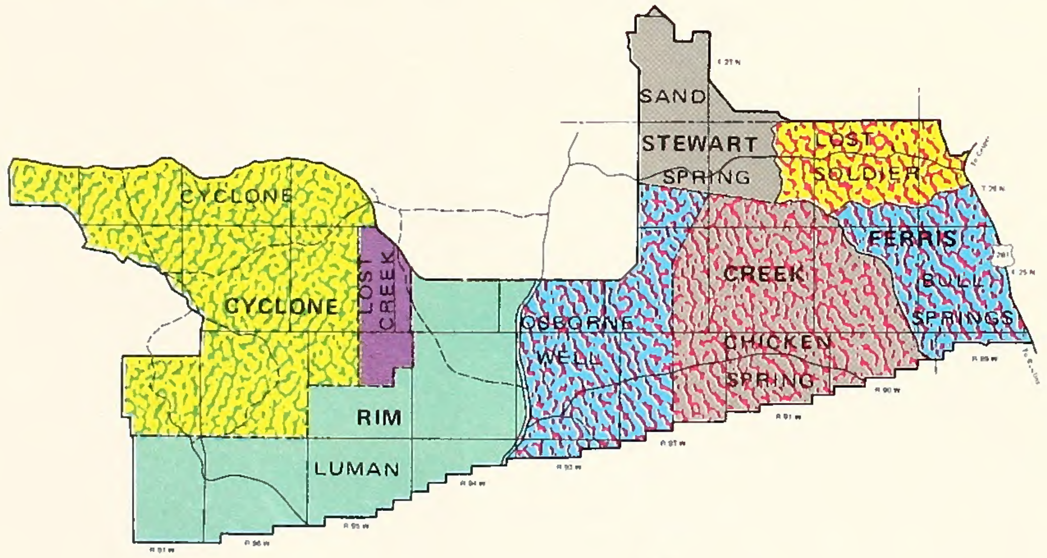
TABLE 1-8
PHENOLOGY OF KEY FORAGE SPECIES BY ALLOTMENT

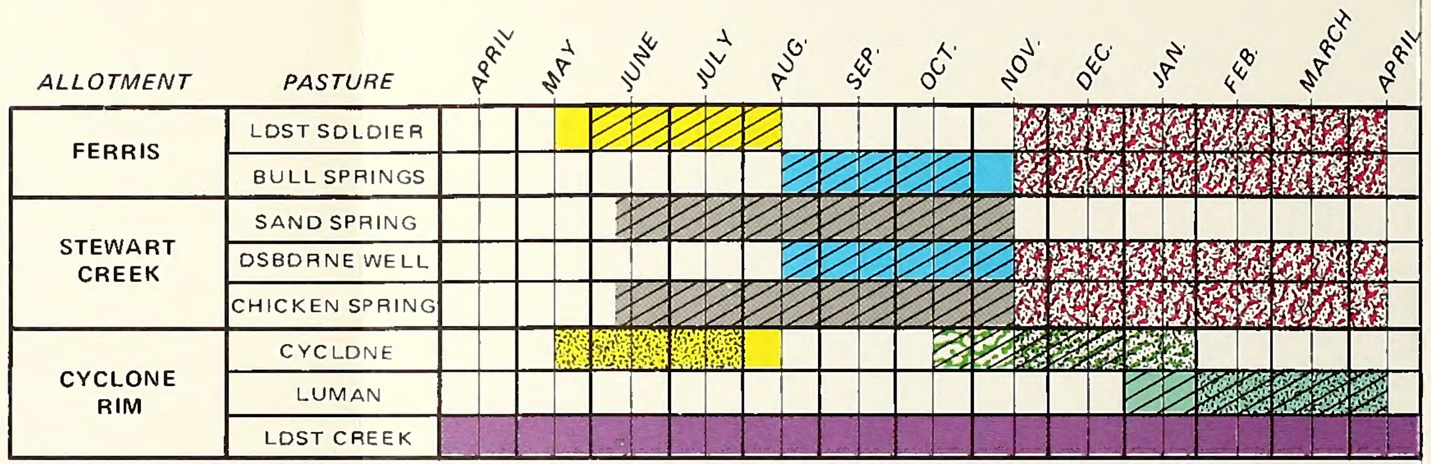
Allotment	Species	Common Names	Start Growth Date	Flowering Date	Seed Ripe Date
Ferris	Agropyron dasystachyum	Thickspike wheatgrass	4-25	7-5	7-20
	Oryzopsis hymenoides	Indian ricegrass	4-25	6-15	7-5
	Poa secunda	Sandberg bluegrass	4-25	6-4	7-1
	Artemisia tridentata	Big sagebrush	No Data	7-10	8-15
Stewart Creek	Agropyron dasystachyum	Thickspike wheatgrass	4-25	7-6	7-19
	Artemisia tridentata	Big sagebrush	No Data	7-26	8-16
	Oryzopsis hymenoides	Indian ricegrass	No Data	No Data	7-12
	Stipa comata	Needle-and-thread grass	No Data	No Data	7-12
Cyclone Rim	Atriplex nuttallii	Nuttall saltbush	4-15	7-1	8-1
	Ceratoides lanata	Winterfat	4-15	7-10	8-15
	Artemisia tridentata	Big sagebrush	4-15	7-12	8-20
	Agropyron spicatum	Bluebunch wheatgrass	4-20	7-1	7-15



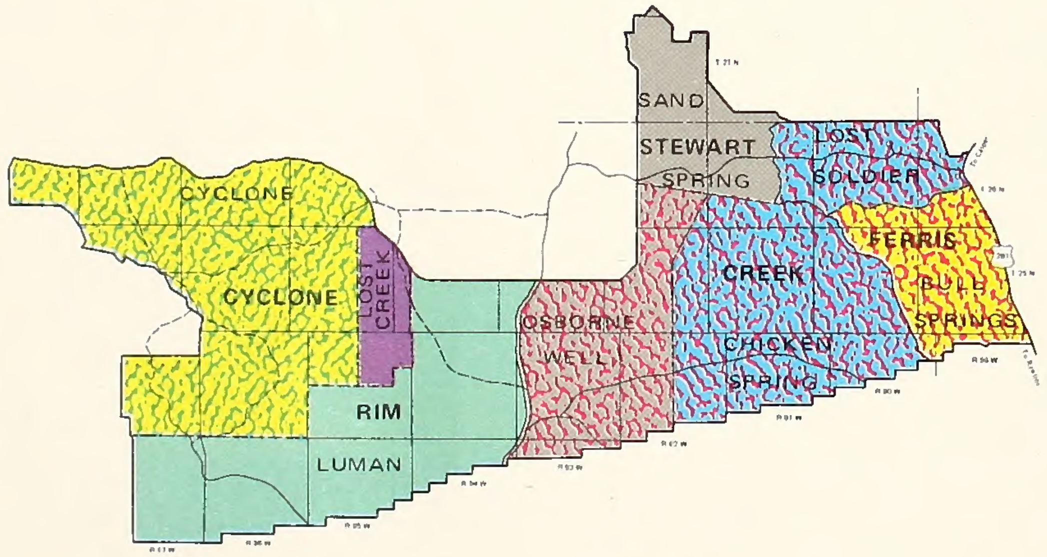


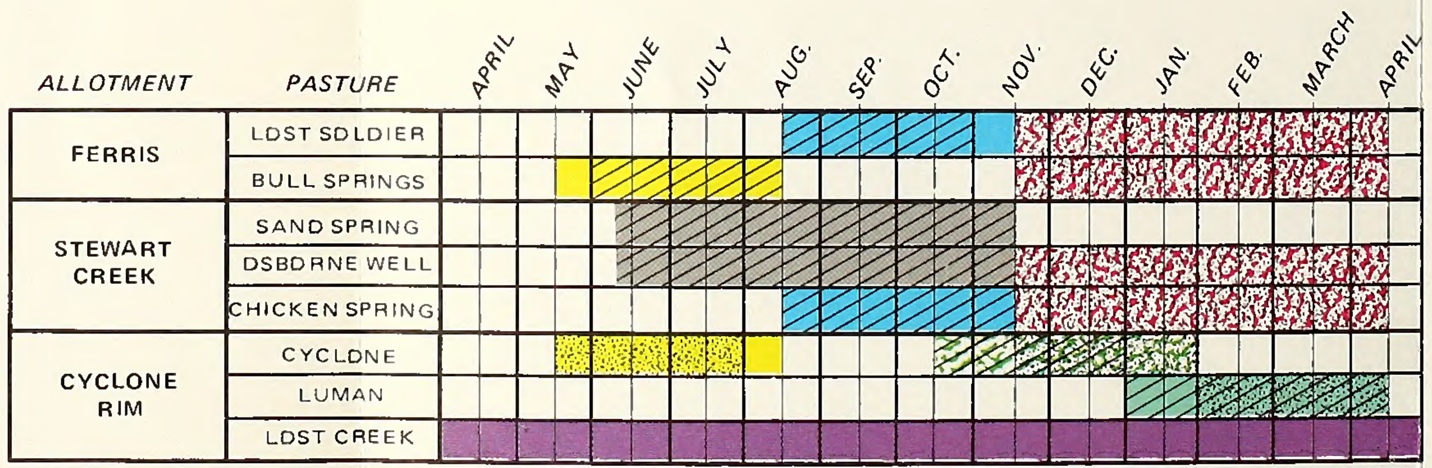
FIRST YEAR CYCLE



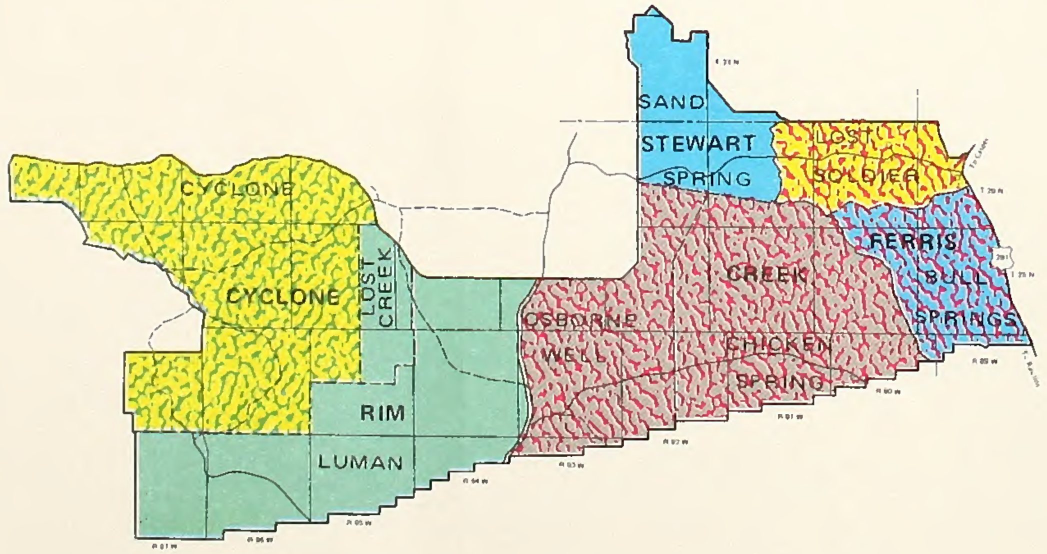


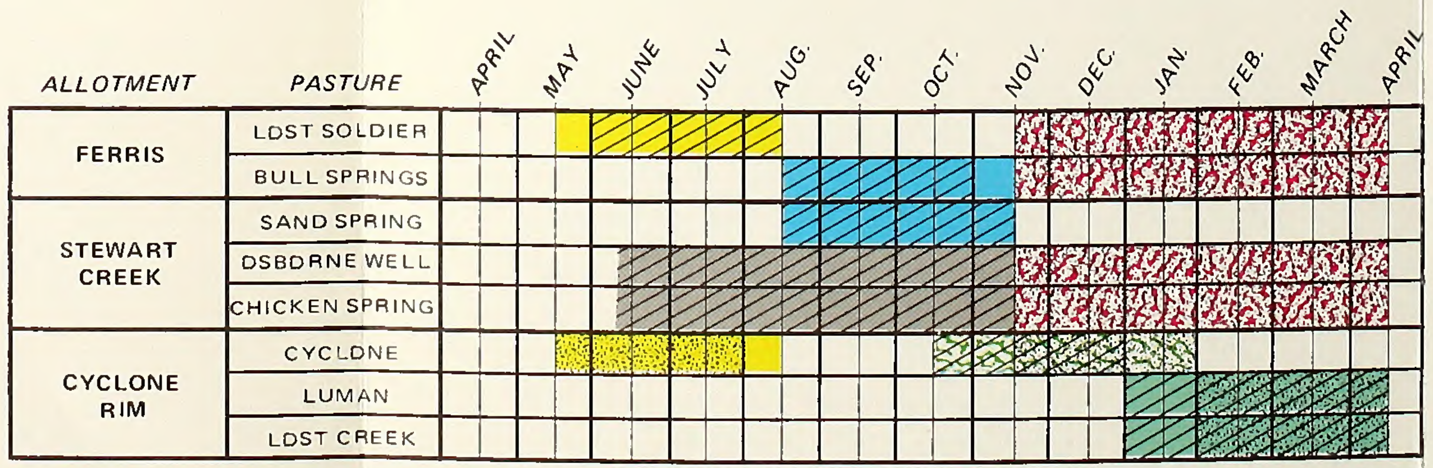
SECOND YEAR CYCLE





THIRD YEAR CYCLE





FOURTH YEAR CYCLE

LEGEND

- ▨ CATTLE
- ░ SHEEP

OVERLAP AREAS OF:

- ▩ CATTLE AND SHEEP

TREATMENT APPLIED

- 🟨 TREATMENT A
- 🟦 TREATMENT B
- ▒ TREATMENT C
- ⬛ TREATMENT D
- ▒ TREATMENT E
- 🟪 TREATMENT F
- 🟩 TREATMENT G

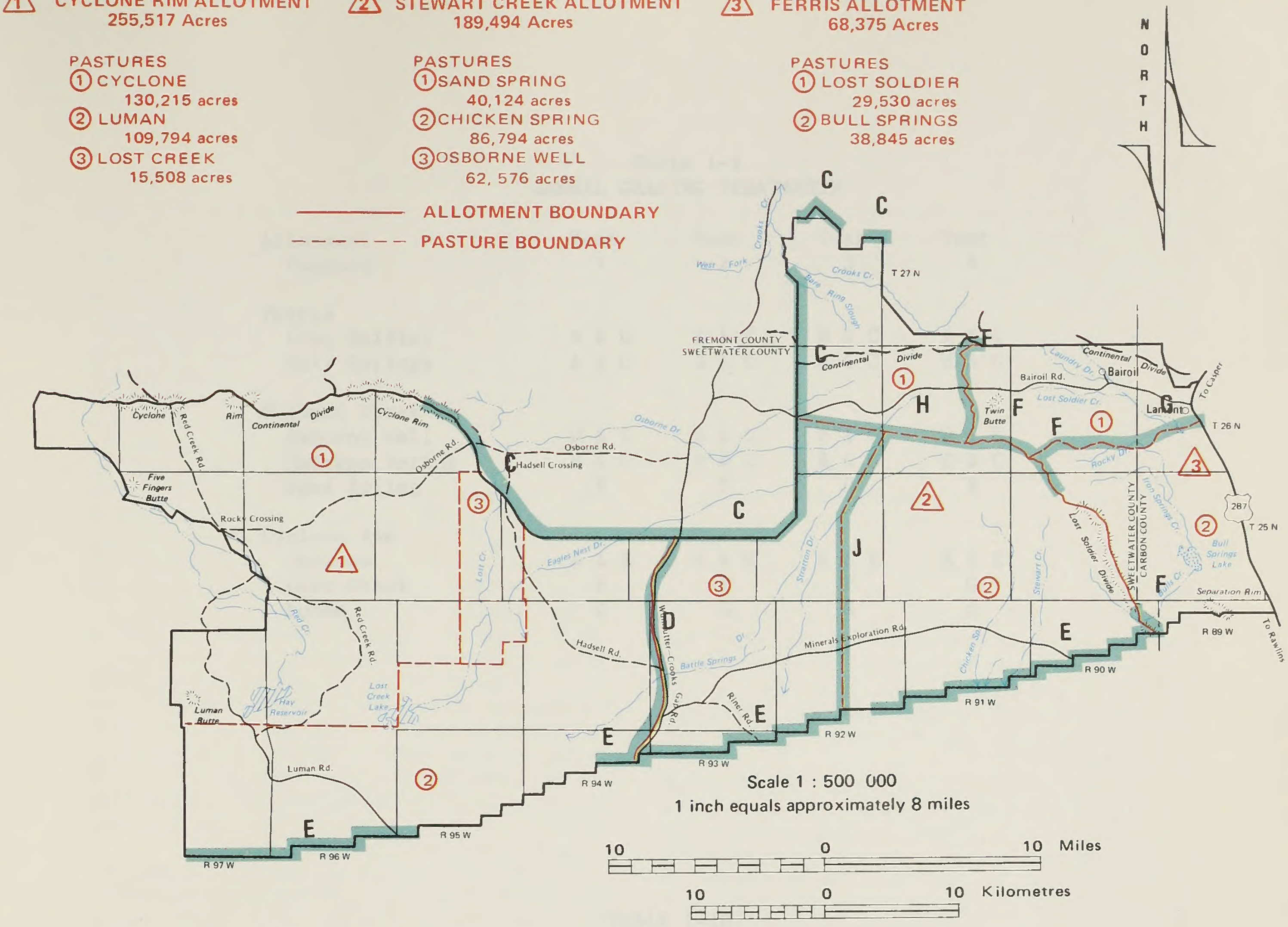
OVERLAP AREAS OF:

- ▒ TREATMENT A AND E
- ▒ TREATMENT A AND C
- ▒ TREATMENT B AND C
- ▒ TREATMENT D AND C

ANNUAL SCHEDULE FOR
PROPOSED GRAZING TREATMENTS

Seven Lakes Grazing
Environmental Statement

Figure 1-3



⚠1 **CYCLONE RIM ALLOTMENT**
255,517 Acres

PASTURES
① CYCLONE
130,215 acres
② LUMAN
109,794 acres
③ LOST CREEK
15,508 acres

⚠2 **STEWART CREEK ALLOTMENT**
189,494 Acres

PASTURES
① SAND SPRING
40,124 acres
② CHICKEN SPRING
86,794 acres
③ OSBORNE WELL
62, 576 acres

⚠3 **FERRIS ALLOTMENT**
68,375 Acres

PASTURES
① LOST SOLDIER
29,530 acres
② BULL SPRINGS
38,845 acres

——— ALLOTMENT BOUNDARY
– – – – PASTURE BOUNDARY

LEGEND

PRIORITY FOR CONSTRUCTION

1st.	**C**
2nd.	**D, E, F**
3rd.	**G, H, J**

🟩 AREAS OF FENCE CONSTRUCTION

FENCE CONSTRUCTION PRIORITIES AS OUTLINED BY MFP – 1

Seven Lakes Grazing

Environmental Statement

Map 1 - 3

TABLE 1-9
ANNUAL GRAZING TREATMENTS

Allotment Pasture	Year 1	Year 2	Year 3	Year 4
Ferris				
Lost Soldier	B & C	A & C	B & C	A & C
Bull Springs	A & C	B & C	A & C	B & C
Stewart Creek				
Osborne Well	D & C	B & C	D & C	D & C
Chicken Spring	D & C	D & C	B & C	D & C
Sand Spring	B	D	D	B
Cyclone Rim				
Cyclone	A & E	A & E	A & E	A & E
Lost Creek	F	F	F	G
Luman	G	G	G	G

TABLE 1-10
ACRES PER GRAZING TREATMENT THROUGH ONE COMPLETE GRAZING CYCLE

Treatment	Acreage			
	Year 1	Year 2	Year 3	Year 4
A	169,061	159,716	169,061	159,716
B	69,147	101,421	116,268	78,492
C	217,689	217,689	217,689	217,689
D	149,344	126,415	102,223	149,344
E	130,216	130,216	130,216	130,216
F	15,508	15,508	15,508	0
G	109,794	109,794	109,794	125,302
TOTAL*	860,759	860,759	860,759	860,759

*The total is greater than the acreage of the ES area because some pastures undergo more than one treatment each year.

tures. Under this system, the allotment would be divided into three pastures of nearly equal carrying capacity. In the first year of full AMP implementation, cattle would be grazed in the Osborne Well and Chicken Spring pastures from May 20 through October 31. On August 1, Sand Spring pasture would be open to grazing and cattle would be driven into it from the other two pastures. All three pastures would be grazed during the August 1 through October 31 period. Sheep would be grazed throughout the winter season (November 1 through March 31) in the Osborne Well and Chicken Spring pastures. No winter use would be made of Sand Spring pasture because heavy snows normally make it inaccessible to livestock. In the second year, the system would be the same as the first year except that grazing in the Osborne Well pasture would be deferred until August 1, and the Sand Spring and Chicken Spring pastures would be grazed from May 20 to October 31. In the third year, the system would be the same as the first year except that grazing in the Chicken Spring pasture would be deferred until August 1, and the Sand Spring and Osborne Well pastures would be grazed from May 20 to October 31. The three-year cycle would be repeated beginning with the fourth year.

The grazing system proposed for the Cyclone Rim allotment would be based upon the need to move livestock from higher to lower elevations as winter snows deepen. It can be characterized as a three-pasture seasonal discontinuous system. The allotment would be divided into three pastures. Two of the pastures, Cyclone and Luman, are of approximately equal carrying capacity. The third pasture, Lost Creek, is smaller than the other two and would have no livestock grazing initially so that the riparian habitat would be protected.

The grazing system in the Cyclone Rim allotment would be the same every year starting with year 4. Summer use would consist of sheep grazing from May 1 to July 15 in the Cyclone pasture. Neither Lost Creek pasture nor Luman pasture would be grazed during the summer. In the winter, the Cyclone pasture would be grazed by sheep from November 1 to January 15, and by cattle from October 1 to December 15. Luman and Lost Creek pastures would be grazed by sheep from January 16 to March 31 and by cattle from December 16 to March 31. The grazing system in the Cyclone Rim allotment for years 1-3 would differ from that beginning in year 4 only in that Lost Creek pasture would be rested year-round for the first 3 years.

Management of the Grazing Systems. In the proposed systems, livestock grazing areas would be controlled by fencing, herding, or limiting available water. Water would be limited by shutting off wells and fencing reservoirs and well sites.

Individual operators would move livestock from pasture to pasture by allowing natural drifting and by herding within the time frames prescribed for each grazing treatment. Livestock would be brought to the Seven Lakes area from other range or ranch property in the spring either by trailing through allotments or by truck. Livestock would be brought to the Seven Lakes area in the fall by the same methods, and at the conclusion of each grazing season, would be moved back to other range or ranch property.

BLM would ensure compliance with the system and monitor the impacts of the system. BLM would issue licenses in accordance with the grazing regulations (43 CFR 4115) for grazing livestock on each allotment within the framework of the grazing system. The grazing license would specify the grazing area, livestock numbers and class, and season of use and AUMs to which the licensee is entitled. BLM employees would make routine allotment inspections to ensure that livestock numbers and time of grazing for each pasture comply with that authorized by the license. In accordance with 43 CFR 4115.2-1(e)(5), grazing privileges would be reduced in whole or in part for as long as necessary when the range is depleted from drought or other causes. BLM would also control livestock trespass in accordance with the grazing regulations (43 CFR 9239.3).

BLM would also conduct studies to provide data for analysis of the plan (see Chapter 4). These studies would include but are not limited to climate, trend, utilization, and actual use. BLM Manual 4412 describes study methods in detail. In addition, the Bureau would study wildlife habitat, aquatic habitat, wild horse habitat and numbers, and watershed conditions. These studies would be designed to monitor progress toward meeting the AMP, wildlife habitat management plan, and wild horse herd management area plan objectives.

If the monitoring studies indicate that specific objectives are not being met, the AMPs would be modified. Modification may include changes in the grazing system, increasing or decreasing the amount of use by livestock, wildlife and/or wild horses, changing the season of use, or any combination of these deemed necessary to achieve the management objectives. If properly usable livestock forage increases over the proposed level (see Chapter 4 for details of the monitoring studies that would measure the increase), the increase would be licensed proportionately to the existing livestock operators in the allotment where the increase occurs. Environmental assessments would be conducted as necessary prior to any modifications outside the scope of this statement.

Range Improvements

Facilities which provide for improved distribution of rangeland livestock, and hence, lead to improved range management, are known collectively as range improvements. Stockwater developments and fences are common range improvements.

Table 1-11 shows the proposed range improvements by allotment for the Seven Lakes ES area. These improvements are needed to implement the AMPs, achieve better distribution of livestock, and increase livestock production by achieving proper utilization of forage over the entire range, as well as to improve the grazing distribution of wild horses and to make new areas suitable for wildlife use. Table 1-12 lists the construction and manpower requirements, by year, for the proposed range improvement projects. Map 1-2 depicts locations of all proposed improvements, by allotment and pasture.

TABLE 1-11
PROPOSED RANGE IMPROVEMENTS BY ALLOTMENT

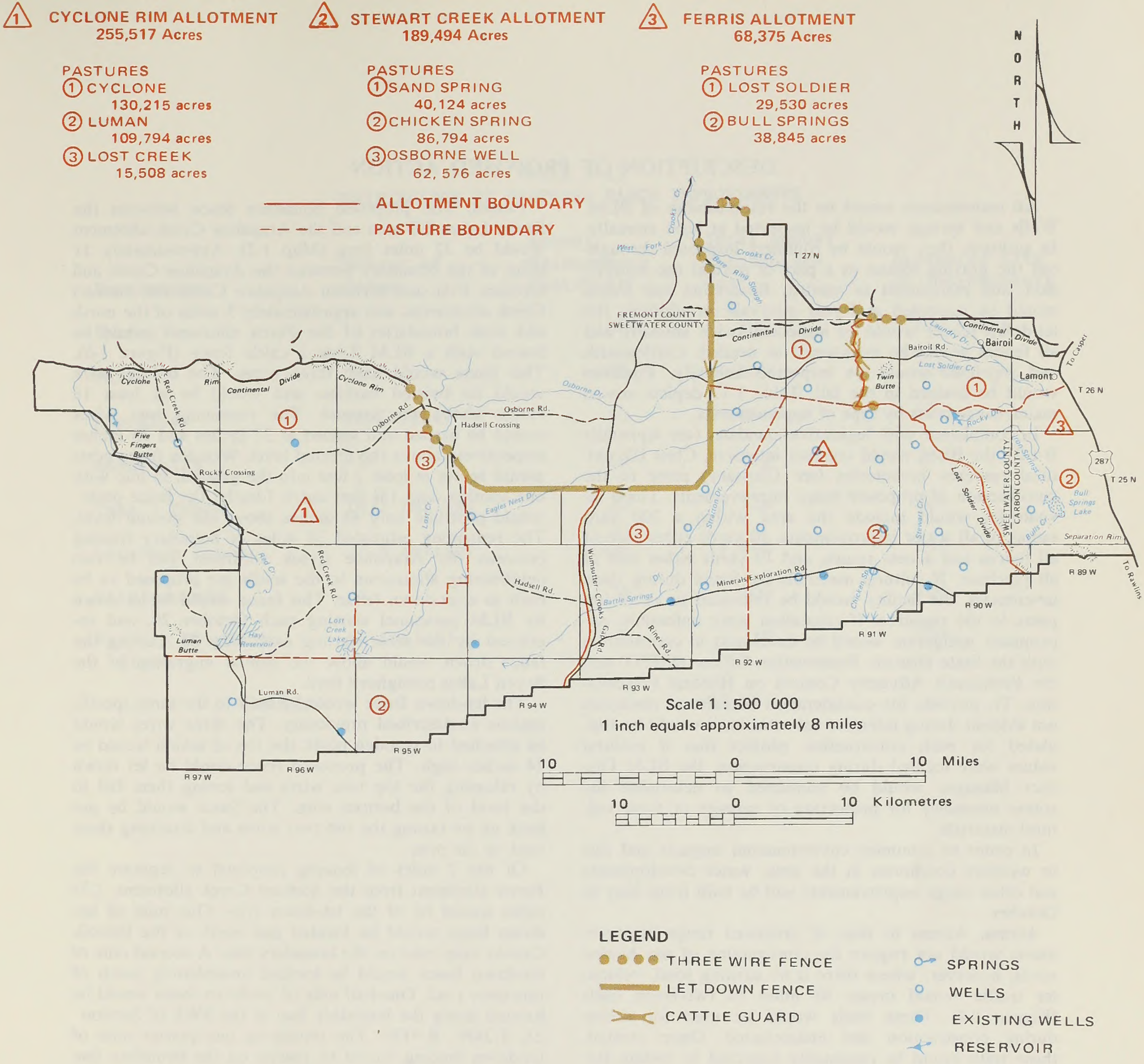
Type Improvement	Allotment Ferris	Allotment Stewart Creek	Allotment Cyclone Rim	Total
Spring Development (number)	0	0	1	1
Type 1 Fence* (miles)	2.4	8.4	5.5	16.3
Let-Down Fence* (miles)	1.4	17.2	9.2	27.8
Cattleguard* (number)	1	2	1	4
Water Well Developments (number)	3	22	10	35
Pasture Boundary Signing (miles)	8	21	35	64
Reservoir Repair	1	0	0	1
Reservoir Fencing (miles)	.3	.8	0	1.1
Water Pipelines (est. miles)	0	12	0	12

*These improvements are shared between allotments and are shown in this table as split between two allotments.

TABLE 1-12
CONSTRUCTION AND MAN-POWER REQUIREMENTS FOR THE PROPOSED RANGE IMPROVEMENT PROJECTS

Year	Project	Units	Cost[1]	Total
1	Type 1 Fencing[2]	16.3 miles	$1,600/mile	$ 26,080
	Let-Down Fencing[3]	27.8 miles	$2,500/mile	$ 69,500
	Cattleguards[4]	4	$2,400/2-lane unit	$ 9,600
	Pasture Boundary Signing[5]	64 miles	$45/mile	$ 2,880
	Spring Development[6]	1	$1,500 each	$ 1,500
	Water Well Developments[7]	13	$13,570 each	$176,410
2	Water Well Developments	9	$13,570 each	$122,130
3	Water Well Developments	13	$13,570 each	$176,410
	Water Pipelines[8]	12 miles	$1,300/mile	$ 15,600
4	Reservoir Fencing[9]	1.1 miles	$1,600/mile	$ 1,760
	TOTAL			$601,870

[1] includes labor and material
[2] 1 man; 1 mile per day
[3] 2 men; ½ mile per day
[4] 2 men; 2 days per cattleguard
[5] 2 men; 10 miles per day
[6] 2 men; for 10 days each
[7] 4 men; for 14 days each
[8] 2 men; 6 miles per day
[9] 2 men; 3/4 mile per day



PROPOSED IMPROVEMENTS

Seven Lakes Grazing

Environmental Statement

Map 1 - 2

All maintenance would be the responsibility of BLM. Wells and springs would be inspected at least annually. In addition, they would be routinely inspected throughout the grazing season as a part of normal use supervision, and maintained as needed. Reservoirs and fences would be inspected at 5-year intervals; in addition, the let-down fences would be inspected twice annually and all fences would be maintained as needed. Cattleguards and pipelines would be inspected annually. Pipelines would be drained in the fall. Table 1-13 depicts annual maintenance costs by type of improvements.

In compliance with legislative mandates (see Appendix B-1-2), the BLM would conduct intensive, Class III, cultural resource inventories (see Glossary) prior to the construction of proposed range improvements. These inventories would include the area within a 200 yard radius of all water improvements, 50 yards either side of all fences and access routes, and 10 yards either side of all pipelines. If cultural materials are found during these inventories, the facility would be relocated to avoid impacts to the resource. If relocation were unfeasible, appropriate mitigation would be developed in consultation with the State Historic Preservation Officer (SHPO) and the President's Advisory Council on Historic Preservation. To provide for consideration of cultural resources not evident during intensive inventories, it would be stipulated for each construction project that if cultural values were located during construction, the BLM District Manager would be contacted to determine the action necessary for protection or salvage of these cultural materials.

In order to minimize environmental impacts and due to weather conditions in the area, water developments and other range improvements will be built from May to October.

Access. Access to sites of proposed range improvements would not require the construction of any bladed roads; however, where there is no existing road, vehicular traffic would create 88 miles of two-track trails (Figure 1-4). These trails would be used for access during construction and maintenance. Once created, these trails could be reasonably expected to sustain frequent enough use to keep them active.

Springs. A spring development is proposed for Kinch-McKinney Springs in the Cyclone Rim allotment. A concrete spring box would be constructed over the spring. Water would be collected among large stones and be piped from the box, about 80 feet via a 1½ inch plastic pipe buried at least 3 feet deep, to a standard cattle trough (Figure 1-5). The trough is typically 2 feet wide, 14 feet long, and less than 20 inches in height. Normally, it is set on a firm base, and overflow is piped back to the draw in which the spring originates. Small animal escape ramps would also be installed.

The immediate area surrounding the spring would be fenced to prevent livestock from trampling and compacting the wet soil. This three-strand fence would enclose an area approximately 100 by 150 feet.

Construction of this spring development would entail some excavation work using a backhoe tractor, both for building the water collection system and for burying the plastic pipe.

Fences. The proposed boundary fence between the Seven Lakes ES area and the Arapahoe Creek allotment would be 32 miles long (Map 1-2). Approximately 11 miles of the boundary between the Arapahoe Creek and Cyclone Rim, and between Arapahoe Creek and Stewart Creek allotments, and approximately 5 miles of the north and west boundaries of the Ferris allotment would be fenced with a BLM Type 1 cattle fence (Figure 1-6). This fence would have three wires. The bottom wire would be twisted barbless and would be at least 16 inches above the ground. The remaining two wires would be barbed and spaced at 27 inches and 38 inches respectively above the ground level. Wooden fence posts would be set at least 2 feet into the ground, in line with one another, and 16½ feet apart. Ideally, the fence posts would protrude only 44 inches above the ground level. The remaining estimated 25 miles of boundary fencing between the Arapahoe Creek allotment and its two neighboring allotments to the south are proposed to be built as a let-down fence. This fence would be let down by BLM personnel starting each October 20, and re-erected by the same starting each May 20. Letting the fence down would allow the annual migration of the Seven Lakes pronghorn herd.

The let-down fence would be built to the same specifications as described previously. The three wires would be attached to wooden posts, the top of which would be 44 inches high. The proposed fence could be let down by releasing the top two wires and letting them fall to the level of the bottom wire. The fence would be put back up by raising the top two wires and attaching them back to the post.

Of the 7 miles of fencing proposed to separate the Ferris allotment from the Stewart Creek allotment, 2.75 miles would be of the let-down type. One mile of let-down fence would be located just north of the Bairoil-Crooks Gap road on the boundary line. A second mile of let-down fence would be located immediately south of this same road. One-half mile of let-down fence would be located along the boundary line in the SW¼ of Section 23, T.26N., R.91W. The remaining one-quarter mile of let-down fencing would be placed on the boundary line in the E½ of Section 5, T.25N., R.90W., where the fence crosses Rocky Draw.

Construction of the proposed Type 1 and let-down fences would require about four persons and two four-wheel drive vehicles. One vehicle would be equipped with an auger for digging fencepost holes.

In most cases, a two-track vehicle trail develops on both sides of a fence, starting with its construction. Gates would be put in the fence every 1.5 miles or at needed road crossings. Four cattleguards would be installed where main roads cross the proposed fences. Two would be placed on the Bairoil-Crooks Gap Road, one at Bull Springs, and one on the Wamsutter-Crooks Gap Road approximately 2 miles east of Eagle's Nest Draw Reservoir No. 1.

Because these are heavily used roads, two 10 by 6 foot cattleguards would be laid end to end to make one 20 by 6 foot cattleguard at each location. They would have concrete bases at each end, and be set over a trench approximately 3 feet deep dug across the width of the

TABLE 1-13
MAINTENANCE OF PROPOSED RANGE IMPROVEMENTS

Improvement	Number of Units	Annual Maintenance Cost/Unit	Total Annual Maintenance Cost	Estimated Life of Improvements
Spring	1	$100	$ 100	20+ years
Wells	35	200	7,000	20+
Pipelines	12 (miles)	50	600	20+
Reservoirs	4	100	400	20+
Type 1 Fence	16.3 (miles)	20	326	20+
Let-Down Fence	27.8 (miles)	160	4,448	20+
Cattleguards	4	25	100	20+
Pasture Boundary Signs	64 (miles)	5	320	20+
TOTAL			13,294	

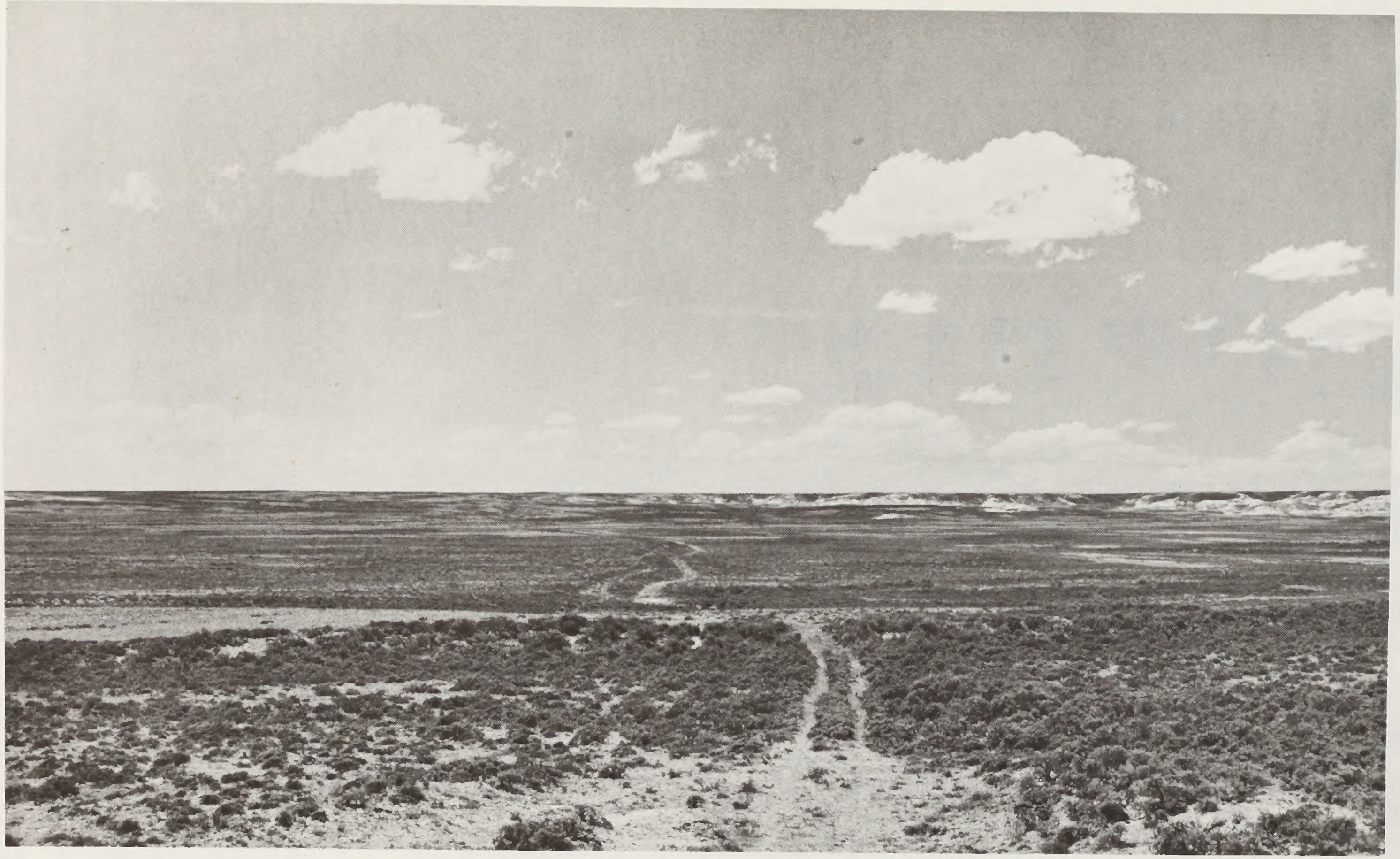


Figure 1-4
TYPICAL TWO-TRACK TRAIL IN
SEVEN LAKES ES AREA

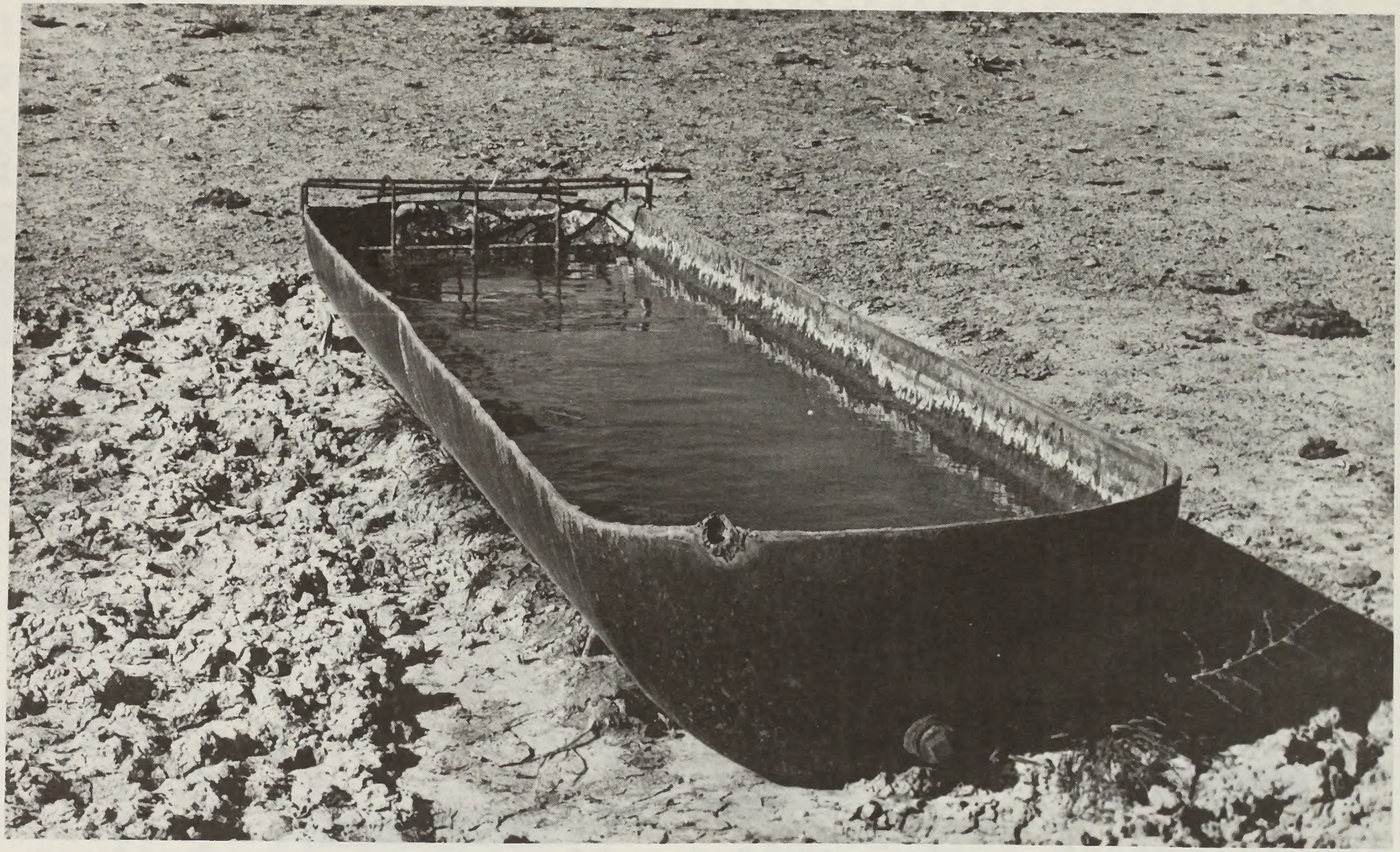
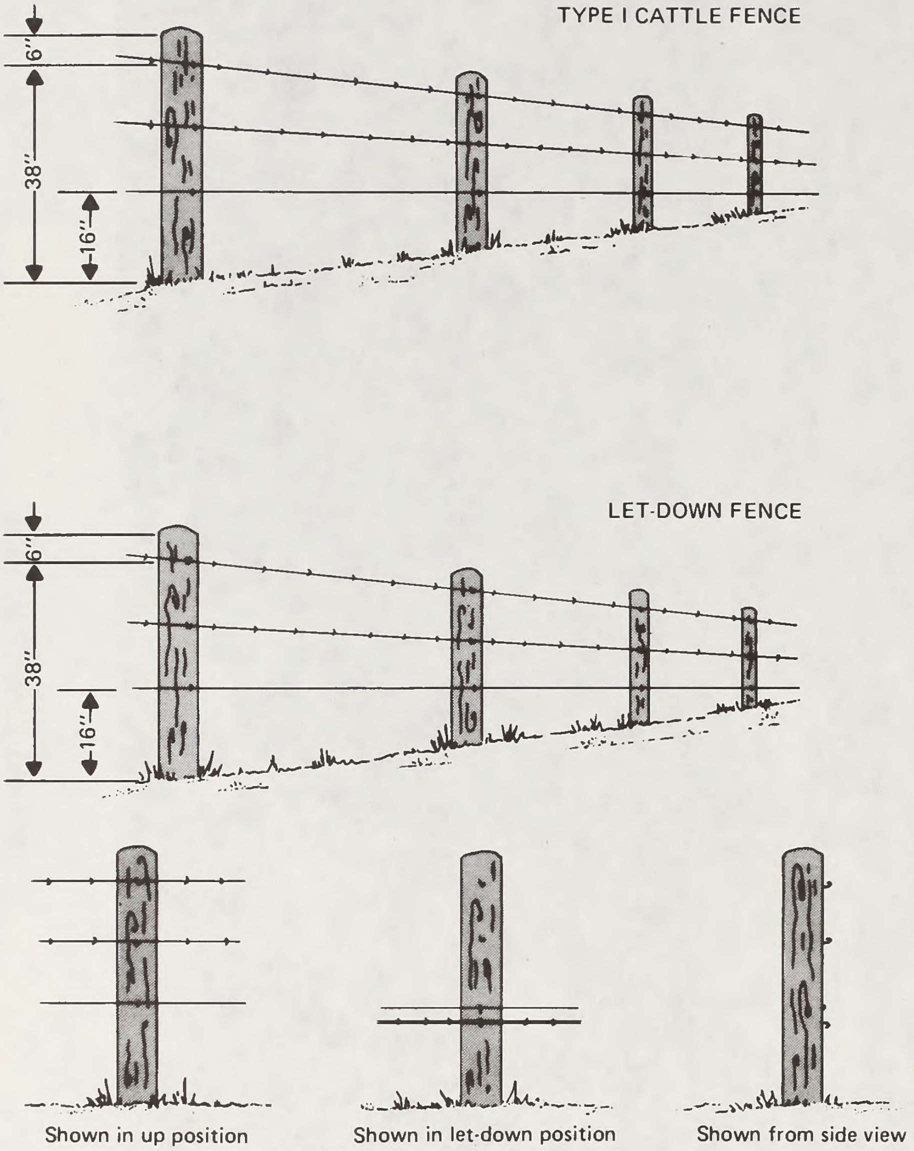


Figure 1-5
STANDARD CATTLE TROUGH



Shown in up position

Shown in let-down position

Shown from side view

Figure 1-6
TYPE I AND "LET DOWN" FENCE

roadbed. Wings would be constructed to connect the cattleguards to the fences. The cattleguards would be placed within existing bladed road rights-of-way. A wire fence gate would be included in the fence adjacent to each cattleguard.

Water Wells. Thirty-five water developments consisting of a windmill (12 foot mill), enclosed steel storage tank (7,500 gallon), a cattle trough (2 x 14 feet), and an earthen overflow pit (30 x 40 feet) have been proposed (Map 1-2 and Figure 1-7). The entire water development site would be enclosed with a BLM Type 1 cattle fence in order to defer the area from cattle use when necessary in accordance with the AMPs.

Normally, construction of water developments would entail first drilling a 4 inch uncased core-type test hole to check for reliable water. Then, if the test is successful, a 6 inch well would be drilled and cased. A service truck and a drill rig would be used.

A large tractor-trailer would be needed to bring the storage tank and parts of the windmill to 35 water development sites. Concrete for the base of the windmill and for supports for the storage tank would be brought in by concrete mixer truck.

The earthen pit would be built using a bulldozer (crawler tractor). The same machine, if equipped with a ripper blade, would lay and bury the plastic pipe connecting the tank, trough, and pit.

A ripper blade is a large curved metal tooth about 3 feet long and about 4 inches wide mounted on the back of the tractor. As it is pulled through the ground, it heaves the soil upward; the plastic pipe is fed through a tube behind the ripper and laid in the ground; the soil falls back, covering the pipeline. A pickup truck would follow behind with one wheel used to compress and compact the soil back to its original level.

Several water developments would be constructed during the same construction season. It would take about 10 weeks to complete five developments and require approximately four workers with two pickups.

The storage tanks would have a storage capacity of 7,500 gallons. When full, discounting evaporative loss from the trough and leaks, a tank would supply 75 cattle with water for about 10 days.

If dry holes are encountered, accessory pipelines would be needed to transport water from a reliable water source in one water development site to another site. These pipelines would be approximately 4 miles long and run downslope. Their locations cannot be determined until the well holes are test drilled. Construction would be accomplished as previously described. All water developments would be fenced with a three-wire fence, which would enclose .22 acres per development.

Pasture Boundaries. Pasture lines would be defined in all proposed allotments by setting posts with attached signs approximately one-quarter mile apart. The Ferris allotment would require 8 miles of pasture boundary marking, the Stewart Creek allotment would require 21 miles, and the Cyclone Rim allotment would need 35 miles.

Six foot steel posts would be driven into the ground with a simple post driver or sledge hammer. A sign explaining that this is a pasture boundary would be attached to each post.

Two persons, equipped with a four-wheel drive truck, could delineate about 10 miles of pasture lines per day.

Reservoir Repair. Whitewater reservoir (Ferris allotment), which is proposed to be repaired and fenced, is inoperable because the dam is washed out. Repair would be effected by installing 18-inch diameter pipe through the dam at the desired water level. The height of the dam would then be raised using a bulldozer pulling a "can" or wheeled scraper-carrier designed to scrape up 15 to 20 yards of soil and spread it where needed. Compaction would be accomplished by repeatedly driving the bulldozer along the top of the dam. A spillway would be constructed at one end of the dam. The bottom of the spillway would be 4 feet above the level of the draw-down pipe.

Whitewater reservoir and three other existing reservoirs in the Stewart Creek allotment would be fenced with Type 1 fence in a rectangular configuration approximately 200 feet by 400 feet. This rectangle would have an interior cross fence that would divide it into two equal parts. One part would enclose the upstream half of the reservoir and would be left closed at all times. The other part would enclose the downstream half of the reservoir and would have a gate that would be left open when livestock were in the pasture and would be kept closed when livestock were not supposed to be in the pasture (see Figure 1-8).

Implementation

The AMPs would be implemented administratively either by agreement with the operators or by the District Manager's decision. Should the operator decline to accept and sign an AMP, it would be implemented by the District Manager's decision, which is subject to appeal in accordance with the grazing regulations (43 CFR 4115.2-3). Table 1-14 depicts the AMP implementation schedule.

The AMPs would be fully implemented (all range improvements complete and all grazing systems operational) in the 5th year. Order of implementation is determined by the length of time required to complete the needed range improvement projects.

INTERRELATIONSHIPS

This section describes how the proposed action relates to existing or proposed federal, state, local, and private projects, plans, and policies in the area of influence. The purpose is to examine how the proposed action fits into the overall planning for the entire area.

Federal

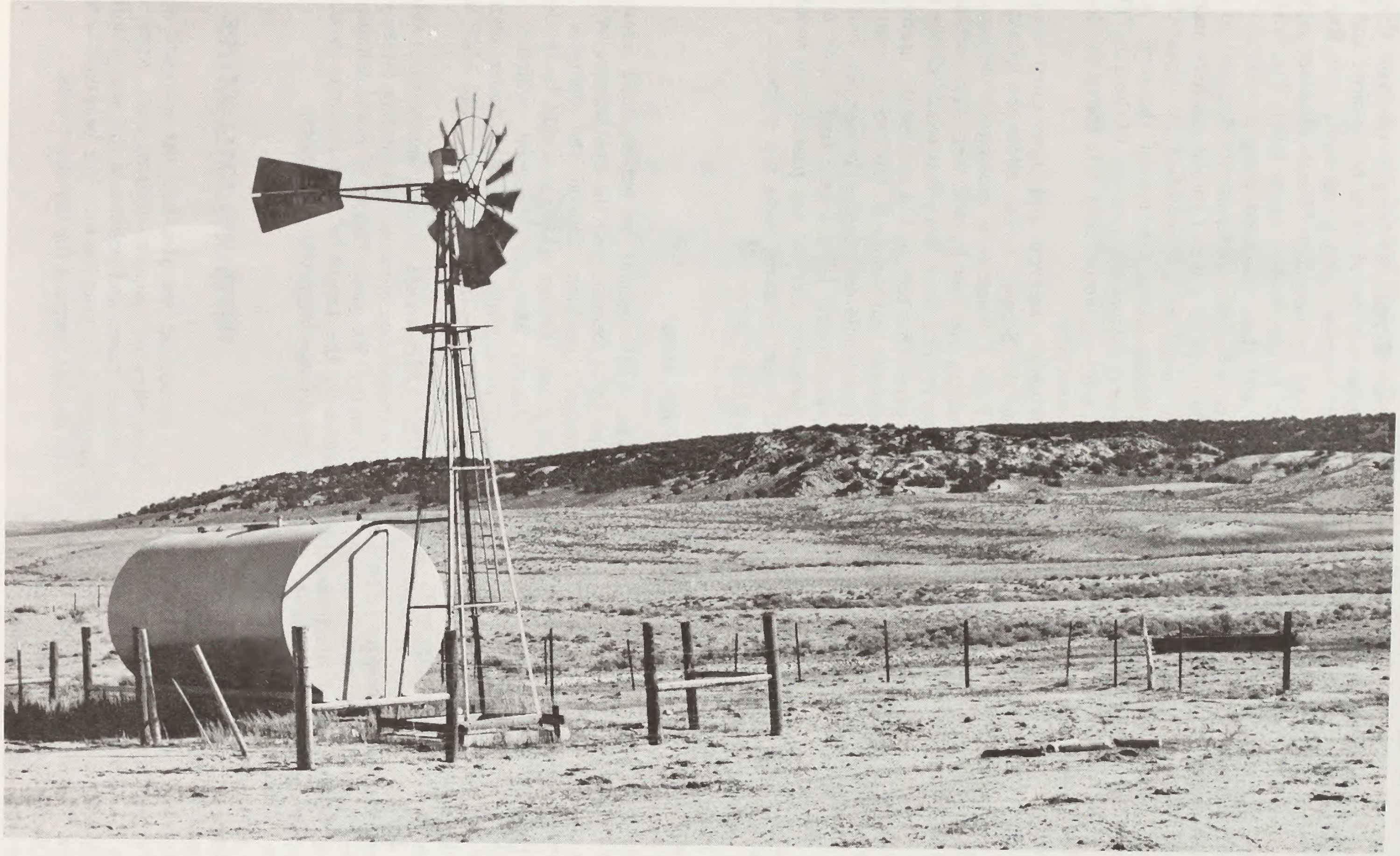


Figure 1-7
BLM WATER DEVELOPMENT SIMILAR
TO WHAT IS PROPOSED FOR THE
SEVEN LAKES ES AREA

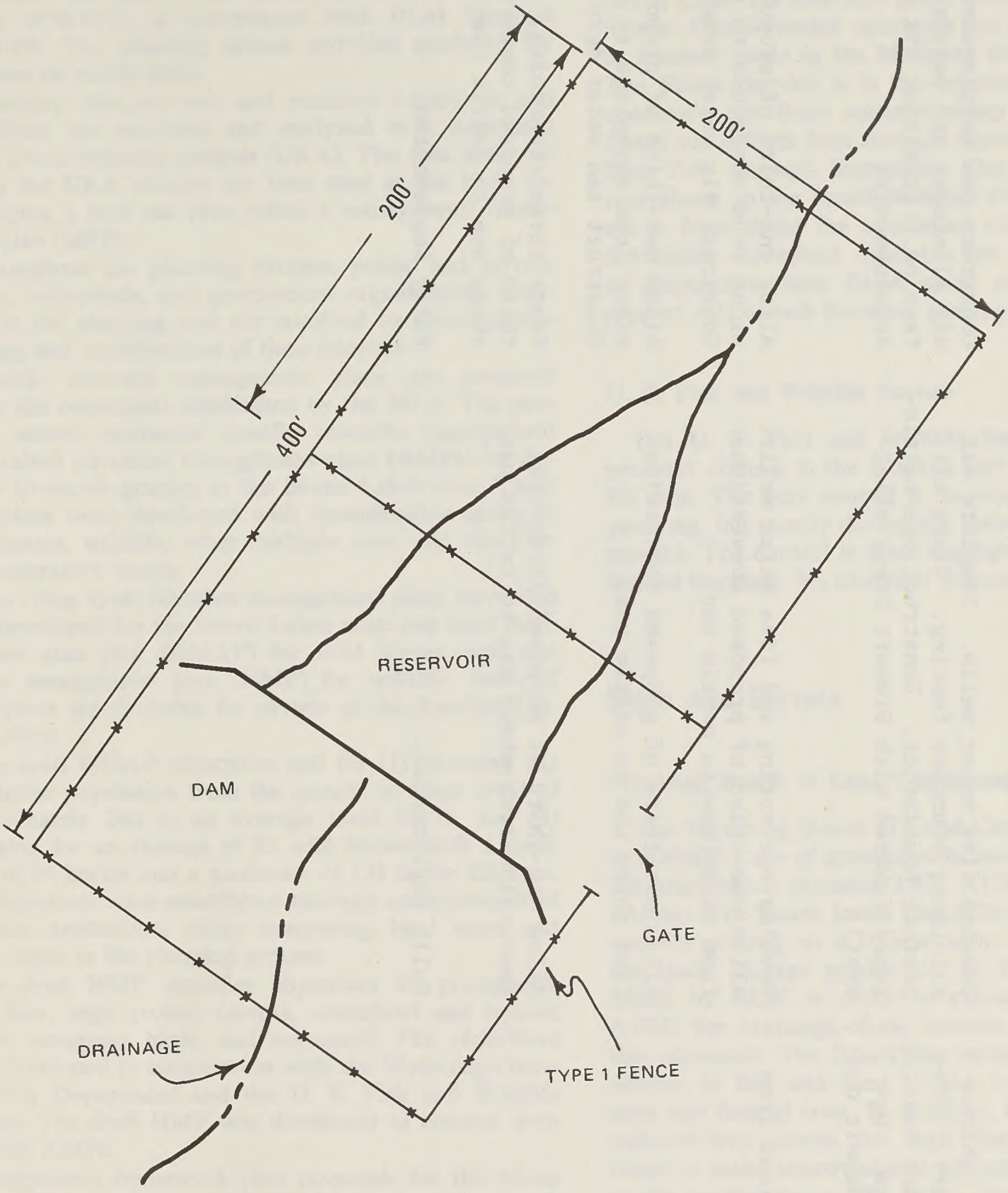


FIGURE 1-8
PROPOSED RESERVOIR FENCING

TABLE 1-14
AMP IMPLEMENTATION SCHEDULE

YEAR	ALLOTMENT Ferris	 Cyclone Rim	 Stewart Creek
1	Construct two cattleguards (shared with Stewart Creek allotment). Construct all allotment boundary fencing. Stake all pasture boundaries. Develop three water wells. Repair one reservoir.	Develop five water wells. Complete all allotment boundary fencing. Stake all pasture boundaries. Construct one cattleguard (shared with Stewart Creek allotment).	Construct one cattleguard. Complete all allotment and pasture boundary fencing. Construct six water developments.
2	Allow all proposed conversions from sheep use to cattle use.	Develop one spring and five water wells. Allow one-third of proposed conversions from sheep use to cattle use.	Allow one-third of proposed conversions from sheep use to cattle use. Construct six water developments.
3	Fully implemented.	Allow one-third of proposed conversions from sheep use to cattle use.	Allow one-third of proposed conversions from sheep use to cattle use. Construct ten water developments.
4		Allow one-third of proposed livestock conversion from sheep use to cattle use.	Fence three reservoirs. Allow one-third of proposed conversions from sheep use to cattle use.
5		Fully implemented.	Fully implemented.

Bureau of Land Management's Planning System

The Bureau of Land Management's land use planning documents for the Seven Lakes area were updated during 1976-1977, in accordance with BLM Manuals 1601-1608. The planning system provides guidance for land uses on public lands.

Inventory data on land and resource conditions and capabilities are recorded and analyzed in a document called a unit resource analysis (URA). The data gathered during the URA process are then used as the basis for developing a land use plan called a management framework plan (MFP).

Throughout the planning process, public and private groups, individuals, and government organizations interested in the planning unit are involved to assure understanding and consideration of their interests.

Specific resource management plans are prepared within the constraints established by the MFP. The proposed action represents specific resource management plans called allotment management plans (AMPs) for domestic livestock grazing in the Seven Lakes area. These draft plans were developed with consideration given to wild horses, wildlife, other multiple uses, and the livestock operators' needs.

Two other draft resource management plans have also been developed for the Seven Lakes area: one herd management area plan (HMAP) for wild horses, and one habitat management plan (HMP) for wildlife. Both of these plans are available for review at the Rawlins District Office.

The draft HMAP objectives call for (1) reducing the wild horse population from the present average level of approximately 240 to an average level of 95, and (2) managing for an average of 95 wild horses with a minimum of 66 horses and a maximum of 135 in the ES area. The objectives were established through consideration of resource production, other competing land uses, and public input in the planning process.

The draft HMP identifies objectives for pronghorn, mule deer, sage grouse, raptors, waterfowl and aquatic habitat, nongame birds, and mammals. The objectives were developed in cooperation with the Wyoming Game and Fish Department and the U. S. Fish and Wildlife Service. The draft HMP was developed in concert with the draft AMPs.

Management framework plan proposals for the Seven Lakes ES area addressed establishment of three new allotments (from the two existing allotments), changes in class of livestock from sheep to cattle, water development, and limited fencing. The MFP also addresses wildlife and wild horse populations and forage allocations. A summary of the proposals in the management framework plan affecting livestock grazing is found in Table 1-15. Other land and forage use proposals that conflicted with livestock grazing are shown in Table 1-16.

U. S. Forest Service

The U. S. Forest Service administers lands to the south of the ES area in the Medicine Bow National Forest in Wyoming and in the Routt National Forest in northern Colorado.

Six of the fifteen livestock operators who use the Seven Lakes ES area also graze livestock in the national forests. Five livestock operators run summer sheep and/or summer cattle in the Medicine Bow National Forest. The Forest Service is in the process of converting one operator's use from summer sheep to summer cattle. Sheep use is from June through October and cattle use is from July through September. One livestock operator runs sheep on the Routt National Forest. The period of use is from about the middle of July to the middle of September. Livestock operators use forest service lands in conjunction with BLM, state, and private lands to support a 12 month livestock grazing operation.

U. S. Fish and Wildlife Service

The U. S. Fish and Wildlife Service is conducting predator control in the western half of the Seven Lakes ES area. The only control is on coyotes and takes place yearlong, but mostly during the spring and early summer months. The control is done through aerial shooting and limited trapping. No chemical toxicants are used.

State and Private

Wyoming Board of Land Commissioners

The Wyoming Board of Land Commissioners administers 26,076 acres of granted state land in the Seven Lakes ES area which contains 2,421 AUMs (4% of the total AUMs). The Board leases the surface to livestock operators for grazing on a 10-year term. The lessee manages the lands. Forage production on these lands is determined by BLM in order to calculate the appropriate AUMs for exchange-of-use licenses for the operator in that allotment. The Board also retains the right to allow anyone to fish and hunt on the land under applicable state and federal laws. In addition, the Board may grant rights-of-way across the land. State leases allow the lessee to make improvements necessary for the operation of the grazing lease. The lessee may sublease the lands, provided he has acquired prior Land Board approvals. The Board retains the right to lease the lands for other purposes such as timber harvest and mineral extraction.

Wyoming Game and Fish Department

"The Wyoming Game and Fish Department, under the direction of the Game and Fish Commission, is charged with the management of the state wildlife for the benefit of the public . . . Implicit in this charge is the responsibility of the Department to provide the public with optimum benefits from the available wildlife resource." (Wyoming Game and Fish Department 1976).

TABLE 1-15
MFP PROPOSALS AFFECTING LIVESTOCK GRAZING*

MFP Step One Recommendations for Livestock Grazing	MFP Step Three Proposals for Livestock Grazing	Reasons for Reduction
Range Management		
1. Reserve the grazing privileges for wildlife held by the Wyoming Game and Fish Commission in the Seven Lakes ES area. The animal unit months (AUMs) are as follows: Seven Lakes incommon allotment - 2,709 AUMs Ferris incommon allotment - 725 AUMs	1. Reserve the grazing privileges for wildlife held by the Wyoming Game and Fish Commission in the Seven Lakes and Ferris incommon allotments. The animal unit months (AUMs) are as follows: Seven Lakes incommon allotment - 2,709 AUMs Ferris incommon allotment - 725 AUMs	1. No reduction.
2. Establish three allotments from the Seven Lakes incommon allotment to achieve better livestock distribution and control. AMPs will be developed on two of these three allotments plus the Ferris incommon allotment immediately after the final MFP decision.	2. Establish three allotments from the Seven Lakes incommon allotment to achieve better livestock distribution and control. AMPs will be developed on two of these three allotments plus the Ferris incommon allotment immediately after the final MFP decision.	2. No reduction.
3. Approve seven requests for a change in class of livestock in the Seven Lakes incommon allotment and Ferris allotment.	3. Approve seven requests for a change in class of livestock in the Seven Lakes incommon allotment and Ferris allotment.	3. No reduction.
4. Construct fences to facilitate proper livestock use of the Seven Lakes following order of priority (see Map 1-3 for locations): a. First priority is fence C. b. Second priority are fences D, E, & F. c. Third priority are the remaining fences (G, H, & J).	4. Fence the north and east boundaries of the Stewart Creek allotment. (All of fences C & F, Map 1-3).	4. To prevent conflict with migrating pronghorn and to maintain open space character.

TABLE 1-15 (CONTINUED)
MFP PROPOSALS AFFECTING LIVESTOCK GRAZING

MFP Step One Recommendations for Livestock Grazing	MFP Step Three Proposals for Livestock Grazing	Reasons for Reduction
5. Develop water throughout the Seven Lakes Unit. The following constraints would apply: Area 1: (Approximately the north two-thirds of the Stewart Creek allotment.) Develop water on an intensive basis for summer livestock use and management. There would be no restrictions on other seasonal or class of animal usage. Area 2: (Approximately the south one-third of the Stewart Creek allotment and basically all of the Cyclone Rim allotment.) Develop water for winter livestock and wildlife use. Water will not be available for livestock use from May 1 to October 31 annually. Area 3: (Ferris allotment.) There will be minimal water development to aid in distribution of winter sheep and in summer cattle management. Area 4: (This area is basically a corridor along the Crooks Gap-Wamsutter Road.) There will be no water development by BLM.	5. Develop water throughout the Seven Lakes Unit. The following constraints would apply: Area 1: (Approximately the north two-thirds of the Stewart Creek allotment.) Develop water on an intensive basis for summer livestock use and management. There would be no restrictions on other seasonal or class of animal usage. Area 2: (Approximately the south one-third of the Stewart Creek allotment and basically all of the Cyclone Rim allotment.) Develop water for winter livestock and wildlife use. Water will not be available for livestock use from May 1 to October 31 annually. Area 3: (Ferris allotment.) There will be minimal water development to aid in distribution of winter sheep and in summer cattle management. Area 4: (This area is basically a corridor along the Crooks Gap-Wamsutter Road.) There will be no water development by BLM.	5. No reduction.

*MFP step 1 includes recommendations for a particular land use such as livestock grazing. MFP step 2 (not included in this table) provides for an analysis of resource conflicts between competing land uses and development of multiple use recommendations. MFP step 3 presents the multiple use management proposals.

TABLE 1-16
OTHER LAND AND FORAGE USE PROPOSALS THAT CONFLICT WITH LIVESTOCK GRAZING

MFP Step One Recommendations	MFP Step Three Proposals	Nature of Conflict With Grazing
Watershed		
1. Protect present water developments or water sources. Areas of concern are springs and flowing water wells. The springs and flowing wells need fencing, cleaning, and water troughs or tanks. Pits or reservoirs adjacent to springs and wells need partial exclosures and maintenance (map 2-3).	1. In conjunction with AMP, HMP, and HMAP development, protect present water developments or water sources. Areas of concern are springs and flowing wells which need fencing, cleaning, and water troughs or tanks. Pits or reservoirs adjacent to springs and wells need partial exclosures and maintenance.	1. Slight reduction in forage. (Less than 1 AUM per water source)
Lands		
1. Make approximately 20 acres available for a sanitary landfill in the N½ of Section 20, T.26N., R.90W.	1. Make appoximately 20 acres available for a sanitary landfill in the N½ of Section 20, T.26N., R.90W.	1. A loss of 1.5 AUMs in forage for the site and the half-access road.
Wild Horses		
1. Maintain approximately 180 wild horses in the Seven Lakes Planning Unit outside the Ferris incommon allotment. Maintain approximately 150 wild horses within the Ferris incommon allotment which would be managed with primary emphasis on wild horses.	1. Manage the planning unit under multiple use for an average population of 130 horses with actual numbers ranging from 90 to 185 horses. For the ES area (map 2-19), this computes to an average population of 95 horses with actual numbers ranging from 66 to 135 horses.	1. Loss of forage which has been allocated for wild horses within the ES area. (464 winter sheep AUMs)

TABLE 1-16 (CONTINUED)
OTHER LAND AND FORAGE USE PROPOSALS THAT CONFLICT WITH LIVESTOCK GRAZING

MFP Step One Recommendations	MFP Step Three Proposals	Nature of Conflict With Grazing
Wildlife		
1. Designate the Seven Lakes Planning Unit as the Red Desert Antelope and Wild Horse Habitat Managment Area and manage the area with wildlife as the highest priority. Management objectives for the area will be to support 5,000 winter and 1,800 summer antelope.	1. Manage the unit under the multiple use concepts, providing habitat for 5,000 winter and 1,800 summer antelope (approximately 1,339 summer antelope in the Seven Lakes ES area) (Allocate 3,434 winter sheep AUMs within the ES area).	1. Allocation of 3,434 winter sheep AUMs of forage for wildlife which will not be available for livestock use.
2. Protect all important water sources and wet meadow areas from destruction or harmful alterations by other activities, particularly mining and excessive grazing.	2. In conjuction with AMP, HMP, or HMAP development, protect all important water sources and wet meadow areas from destruction or harmful alterations by other activites, particularly mining and excessive grazing by fencing, livestock distribution and controlling access.	2. Loss of 3 winter sheep AUMs of forage.
3. Reserve a sufficient amount of forage to support 300 deer in those areas identified as crucial winter ranges (map 2-14).	3. Reserve a sufficient amount of forage to support 300 deer in those areas identified as crucial winter ranges (map 2-14).	3. Loss of 504 winter sheep AUMs of forage
4. Protect ponds, reservoirs, streams and wetlands providing good potential for waterfowl nesting from excessive livestock use by fencing. Additional areas may be identified in the HMP for development.	4. In conjunction with AMP, HMP, or HMAP development, protect ponds, reservoirs, streams, and wetlands providing good potential for waterfowl nesting from excessive livestock use, usually by fencing. Additional areas for development may be identified in the HMP.	4. Loss of approximately 2 winter sheep AUMs.

TABLE 1-16 (CONTINUED)
OTHER LAND AND FORAGE USE PROPOSALS THAT CONFLICT WITH LIVESTOCK GRAZING

MFP Step One Recommendations	MFP Step Three Proposals	Nature of Conflict with Grazing
5. Prevent the destruction of any active beaver ponds or the adjacent food supply on Crooks Creek, Lost Soldier Creek and Arapahoe Creek. Transplant beaver to these areas where the habitat is available and an insufficient number are present.	5. Prevent the destruction of any active beaver ponds on public land or on the adjacent food supply if it too is located on public land, through livestock distribution or fencing.	5. Loss of less than 3 winter sheep AUMs of forage.
6. Avoid any action which may be detrimental to the stream fisheries habitat in Crooks Creek, Arapahoe Creek, Alkali Creek and Lost Soldier Creek.	6. Avoid destruction of any stream fisheries habitat of Crooks Creek through livestock distribution or fencing.	6. Loss of less than 1 winter sheep AUM.

DESCRIPTION OF PROPOSED ACTION

Through interagency cooperative efforts, Wyoming Game and Fish Department (WG&F) has participated extensively in planning for the Seven Lakes area by : (1) written comments, (2) personal meetings, and (3) public meetings. This input was carried forth in AMP development. The wildlife population levels provided by WG&F were used to estimate the forage reservations for wildlife.

The Wyoming Game and Fish Department manages 30,436 acres of private property plus three state sections (1,920 acres) south of the ES area. This property used to serve as base property for livestock grazing privileges within the ES area, but now through an understanding between the Department and BLM, these AUMs are reserved for wildlife.

Private

The private lands in the Seven Lakes ES area contain 104 AUMs (less than 1% of the total AUMs). They are primarily owned by the livestock operators in the area. Forage production on these lands is determined by the BLM in order to provide the basis for issuance of an exchange-of-use license.

CHAPTER 2

DESCRIPTION OF THE ENVIRONMENT

The description of the existing environment covers the following resources or land uses: climate, air quality, paleontology, topography, soils, water resources, vegetation, animals (terrestrial, aquatic, wild horses), cultural resources, visual resources, recreation, livestock grazing, mineral resources, transportation, and socioeconomic conditions. The degree of detail in the description of each resource or land use relates directly to the degree of anticipated impacts. The concluding section of this chapter describes the anticipated future environment if the proposed action is not implemented.

EXISTING ENVIRONMENT

CLIMATE

The Seven Lakes ES area has a semiarid climate (Hunt 1974). This means that the potential evaporation and transpiration from soil and vegetation exceeds the average annual precipitation.

There are no long-term climatic records within the ES area, but three nearby towns do have climatic records. Wamsutter is approximately 30 miles south, Rawlins is 20 miles southeast, and Muddy Gap is about 10 miles northeast of the area. These climatic records are summarized in Table 2-1.

Precipitation

As indicated by the records of Wamsutter, Rawlins, and Muddy Gap, mean annual precipitation ranges from 5.78 inches to 9.51 inches (Table 2-1). April, May and June are the peak precipitation months. The lowest annual precipitation at Wamsutter has been as low as 3.82 inches (1976). Generally, the northern part of the ES area receives more precipitation than the southern part.

Snowfall commonly occurs from November through April and averages 27 inches at Wamsutter and 53 inches at Muddy Gap (U.S. Department of Commerce 1965). Topography and vegetation are the major influences on snow distribution. Due to high winds, a continuous cover of snow only occurs behind breaks in topography and brush stands. The exposed slopes and ridges usually blow free of snow after storms, enabling wildlife and sheep to forage.

Temperature

Temperatures of the area vary widely with the seasons, and freezing temperatures may occur in any month. Wind chill factors greatly reduce the measured temperatures as sensed by living organisms.

Frost-free periods around the ES area range from 90 days in Wamsutter to 106 days in Muddy Gap. The northeastern portion of the ES area has a slightly longer growing season than the other portions.

Wind

As is shown in Table 2-2, winds are usually from the southwest and the west-southwest, and average wind velocity is near 12 miles per hour.

AIR QUALITY

The air quality of the Seven Lakes ES area is good, since the recorded air pollution levels are well below federal and state standards. Sampling at the Minerals Exploration Co. Mine site (T.24N., R.93W.) over a 1 month period showed suspended particulate matter 24-hour concentrations to range from 4 to 90 micrograms per cubic meter ($\mu g/m^3$) (Woodward-Clyde 1976), which is well below the 150 $\mu g/m^3$ federal secondary and state standards (Schick 1976). Sampling of suspended particulates at Rawlins for the last 6 months of 1975 showed a geometric mean of 16 $\mu g/m^3$, which is well below the annual allowable mean of 60 $\mu g/m^3$ (Schick 1976). Additional samplings at the Sweetwater Uranium Project found maximum 3 hour concentrations of sulphur dioxide (SO_2) to be .013 parts per million (ppm), and maximum 1 hour concentrations of nitrogen dioxide (NO_2) to be .075 ppm (Woodward-Clyde 1976). The federal and state standard for SO_2 is .5 ppm which is much higher than was measured. The 1 hour concentration of NO_2 is not comparable to the annual mean standard of .05 ppm, but the mean of the period of sampling at the mine site would indicate levels below the standards.

PALEONTOLOGICAL RESOURCES

The Seven Lakes ES area has no identified paleontological resources of National Landmark significance. The

TABLE 2-1
PRECIPITATION AND TEMPERATURE MEANS
AND EXTREMES (1951 to 1976)*

	Rawlins		Muddy Gap		Wamsutter	
Month	Mean Precipitation (inches)	Mean Temperature (°F)	Mean Precipitation (inches)	Mean Temperature (°F)	Mean Precipitation (inches)	Mean Temperature (°F)
January	.46	21.2	.30	21.9	.14	17.9
February	.55	23.5	.46	25.4	.22	21.8
March	.67	28.1	.52	30.0	.28	27.7
April	1.05	38.8	1.19	41.1	.55	38.8
May	1.09	49.9	1.92	51.5	.81	50.0
June	.92	59.2	1.13	61.0	.83	58.6
July	.69	67.2	.91	68.7	.56	65.9
August	.61	65.1	.61	66.9	.73	64.0
September	.81	54.7	.72	56.8	.57	54.9
October	.83	43.7	.79	46.5	.56	44.2
November	.49	30.5	.41	32.4	.26	29.5
December	.54	23.0	.55	23.9	.27	20.4
Annual Mean	8.71	42.1	9.51	43.8	5.78	41.2
Highest Annual Precipitation	11.72 (1965)		17.10 (1957)		9.43 (1957)	
Lowest Annual Precipitation	4.90 (1954)		4.54 (1969)		3.82 (1976)	
Highest Temp. °F.		98 (July)		100 (July)		97 (June)
Lowest Temp. °F.		-36 (Jan.)		-34 (Jan.)		-37 (Jan.)
Frost Free Days** (32°F or above)	103 (6/3 to 9/14)		106 (5/29 to 9/12)		90 (6/7 to 9/5)	

*Source: U.S. Department of Commerce, Annual Summaries of Climatological Data, National Oceanographic and Atmospheric Administration Environmental Data Service.
**1961 to 1976.

TABLE 2-2
ANNUAL PERCENT FREQUENCY OF WIND SPEED AND DIRECTION
RAWLINS, WYOMING*
(1960-1964)

	Speed Groups in MPH							
Direction	0-5	6-12	13-15	16-24	25-31	32-38	39 & Greater	Total
N	.15	1.38	.28	.42	.03			2.26
NNE	.04	.70	.19	.32	.01			1.26
NE	.12	1.72	.44	.71	.04	.002		3.03
ENE	.09	1.31	.33	.60	.02			2.35
E	.11	1.14	.23	.35	.02			1.85
ESE	.07	.49	.05	.07	.002			.68
SE	.05	.50	.04	.05				.65
SSE	.03	.19	.04	.04	.002			.30
S	.09	.62	.11	.23	.01			1.06
SSW	.04	.78	.26	.89	.16	.04	.002	2.17
SW	.22	6.03	2.21	7.84	1.22	.31	.06	17.90
WSW	.25	8.92	3.95	12.29	1.43	.33	.02	27.19
W	.12	3.62	1.31	3.97	.36	.05	.01	9.44
WNW	.07	1.16	.41	1.15	.09	.01		2.89
NW	.16	1.58	.28	.40	.02	.005		2.44
NNW	.10	1.01	.12	.22	.02			1.47
CALM	23.07							23.07
PERCENT	24.78	31.15	10.25	29.55	3.43	.74	.09	100.00

*U. S. Department of Commerce National Climatic Center, Asheville, N.C., 1975.

Red Desert and Great Divide Basins have been evaluated as large areas of considerable paleontological potential. All exposures of the Wasatch Formation throughout the ES area could potentially reveal vertebrate fossil deposits. The small collections made thus far from Wasatch exposures in the Red Desert and Great Divide Basins indicate an Early to late Early Eocene age. These collections add to knowledge of the composition of Early Eocene faunas. Their significance will be greatly enhanced once additional stratigraphically documented collections can be made and published.

TOPOGRAPHY

The Seven Lakes ES area lies within the Great Divide Basin of central Wyoming. The area consists of large expanses of flat basins and gently rolling hills (Map 2-1). The elevation of the area ranges from 6,480 feet at Circle Bar Lake to 8,140 feet on Stratton Rim, with an average elevation of 6,800 feet. Except for a few ridges—Cyclone Rim, Lost Soldier Divide, Bull Spring Rim—the average slope is less than 4%.

The area is covered with sediment gravels with little exposed bedrock. The age of the rocks ranges from recent gravels to Cretaceous sandstones and shales.

SOILS

Soils in the Seven Lakes ES area are developing in a semi-arid environment. The low precipitation, high evaporation rates, and sparse vegetative cover reflect a soil which has a light colored surface with light brown subsoils and white powdery carbonate accumulations in the substrata.

The soils in this area can be grouped into four general categories: saline, alluvium, sand dunes, and shallow (Map 2-2). Each group contains inclusions of soils which do not have the properties or support the vegetation of the generalized group. A brief characterization of each group, the soil mapping unit number from field sheets, the associated vegetation types, and inclusions follow.

1. Saline soils (214, 301, 310, 311, 316, 319, 320)

Saline soils are characterized as having large quantities of alkali present in the upper soil profile. They comprise 36% (183,026 acres) of the Seven Lakes ES area. These soils are generally highly susceptible to crusting, difficult to revegetate, and provide poor to fair sites for construction of roads or reservoirs. Inclusions in this group consist of rock outcrops and non-saline (alluvium, sand dunes, and shallow) soils. Vegetation normally associated with this soils group includes greasewood, saltbush, meadow, and waste area types (see Vegetation section).

2. Alluvium (202, 204-208, 303-308, 313, 314, 317, 318)

The soils in this group comprise 57% (289,947 acres) of the ES area and consist of soils developing in alluvium. Soil textures normally range from sandy loam to sandy clay loam. Revegetation potential for this group is fair to good, and the soils are normally suitable for construction of roads and reservoirs. Inclusions in this group consist of saline soils in some of the drainages, stony alluvium or glacial till located primarily along Separation Rim and the footslopes of Whiskey Mountain, and rock outcrops. Vegetation normally associated with this group includes the sagebrush and grass types (see Vegetation section).

3. Sand dunes (209, 321)

This group is characterized by sandy textured soils deposited by wind action. It comprises 2% (12,290 acres) of the ES area. The area located in the southwest corner of the ES area (Soil Map Unit 321) is dominated by saline soils, but the sand dunes set the character of the area. Soils in this group generally have low water holding capacities, are difficult to revegetate, are highly susceptible to wind erosion when disturbed, and are generally unsuitable for construction uses. Inclusions consist primarily of sandy soils overlying bedrock and saline soils between the dunes. Vegetation normally associated with this group includes grass and sagebrush types (see Vegetation section).

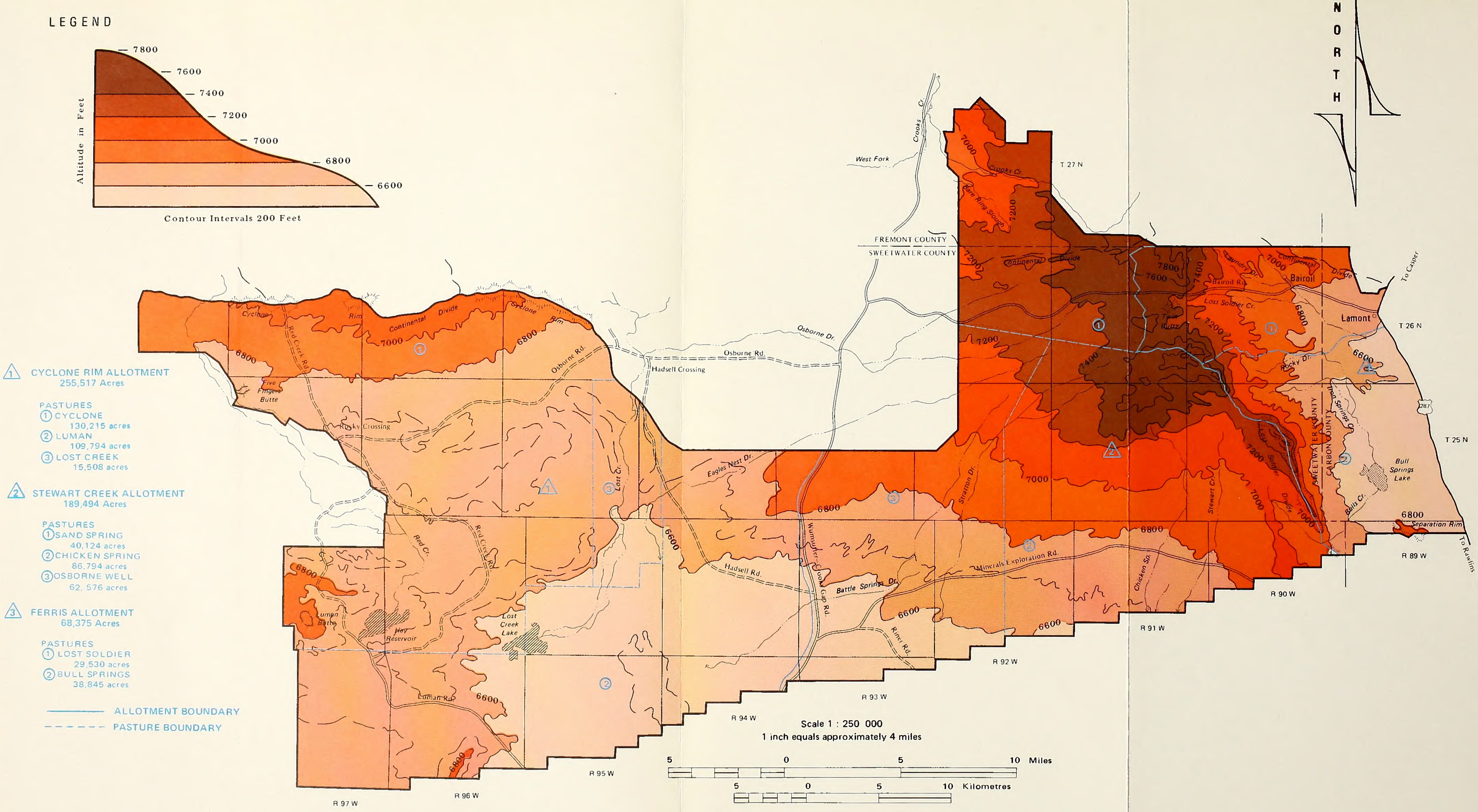
4. Shallow soils (302, 312)

Shallow soils comprise 5% (27,591 acres) of the Seven Lakes ES area. They are less than 20 inches deep, droughty, and variable as to soil texture, salt content, percentages of stone, and susceptibility to crusting. They are generally unsuitable for construction purposes. Inclusions consist of moderately deep soils in drainages and rock outcrops. Vegetation normally associated with this group includes sagebrush and saltbush types (see Vegetation section).

The generalized soils map (Map 2-2) does not match exactly with the generalized vegetation type lines (Map 2-4) in all instances for the following reasons:

1. The class of livestock and the season of use on an area can change the vegetation composition on a particular soil. For example, the E½ T.24N., R.93W. has been historically used as winter sheep range and has resulted in a change of the dominant vegetative composition from shrub to grass.

2. Area on the leeward (east side) of the playas receive salts removed by wind action; however, the distribution of these salts is not uniform. Generally species which can stand relatively high concentrations of salt will dominate the vegetative community on these inclusions (for example nuttall saltbush and western wheatgrass).

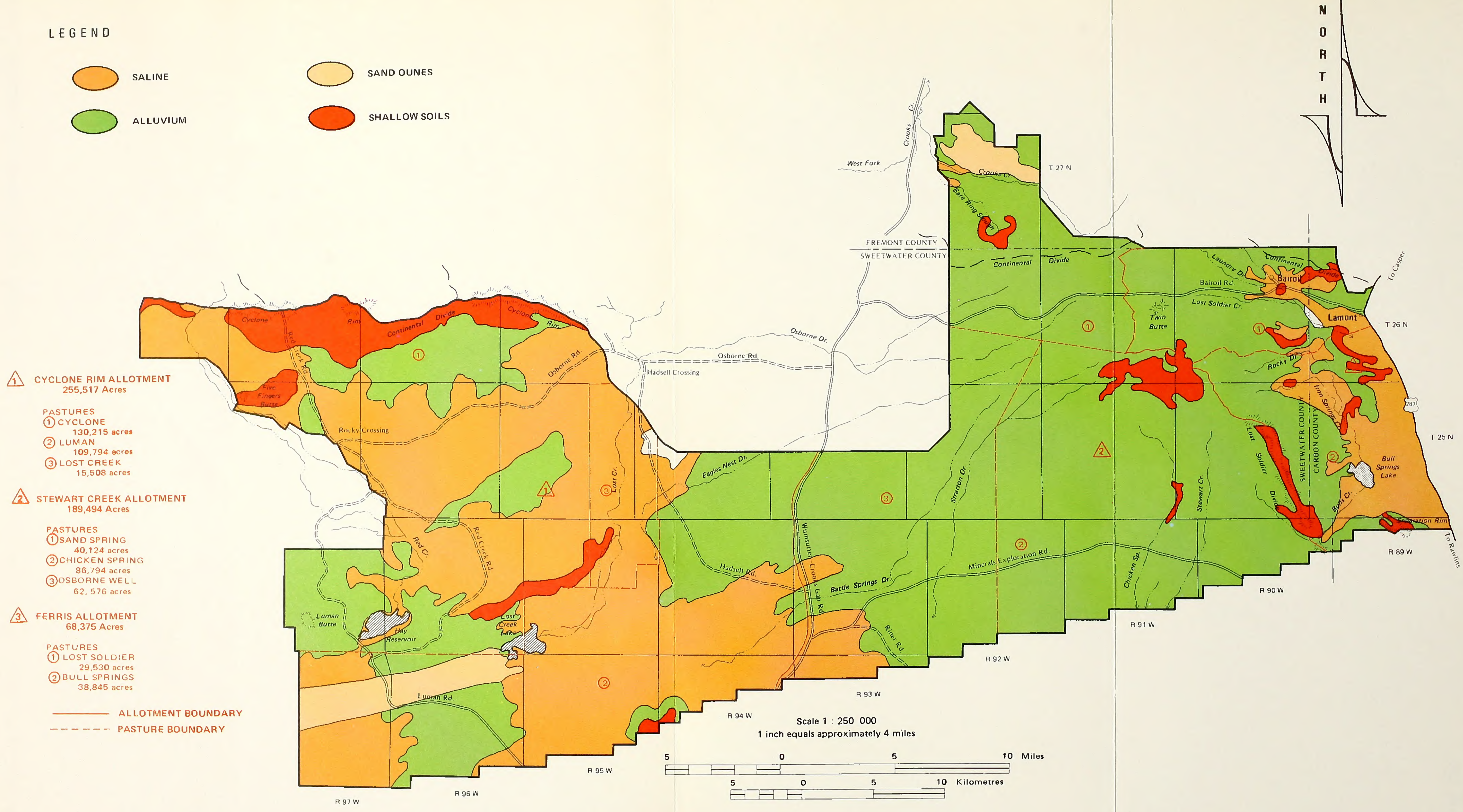


TOPOGRAPHIC RELIEF

Seven Lakes Grazing

Environmental Statement

Map 2 - 1



GENERALIZED

SOIL GROUPS

Seven Lakes Grazing

Environmental Statement

Map 2 - 2

3. There are many areas which are covered by sand dunes. The vegetation supported by this soil inclusion is not the same as that supported by the dominant soils of the area. For example, many small sand dunes near Highway 287 support vegetation similar to that produced on the general sand dunes soils group (normally grass and sagebrush types).

Soil Inventory

A reconnaissance soil survey at the phases of soil families level was conducted during the summer of 1976 to determine the location and extent of soils in the Seven Lakes ES area. A soils map showing map unit locations and soil groups is available in the Rawlins District Office. Soil map units were established by outlining geomorphological features on 2 inches/mile aerial photographs. The information on the aerial photographs was transferred to USGS topographical maps using a zoom transfer scope. The soils within the outlined areas were looked at on the ground (by digging soil pits) and from the air to determine types and the percentage of each soil type within a mapping unit, respectively.

The soil survey was conducted to obtain information for general planning purposes. Areas where site specific projects are anticipated would need additional survey work. The survey identified the major soils in the area and their locations. Appendix B-2-20 presents the mapping units for the ES area. Appendix B-2-21 presents some of the important properties of each mapping unit.

Erosion

Sediment yield was determined using the Pacific Southwest Inter-Agency Committee (see Appendix B-2-18) method. Sediment is being removed from the soil surface (sheet and rill erosion) and gullies (gully erosion) at a rate of approximately 121 acre feet per year within the ES area and is deposited in the stream channels and lake basins downstream. Table 2-3 gives present sediment yield in each allotment by soil type. Erosion classes are defined (USDI, BLM 1976) from the Sediment Yield Rating System in acre feet per square mile per year (ac ft/sq mi/yr) as follows:

Erosion Class	(ac ft/sq mi/yr)
Low	0-0.3
Mod.	0.3-0.9
High	0.9 or greater

Approximately 97% (497,881 acres) of the soils are classed low and 3% (14,973 acres) are classed moderate. There are no soils in the Seven Lakes ES area that are classed high.

Wind Erosion

The wind erosion potential varies with soil type. Wind erodibility group ratings which show the relative rates that soils will erode are in Appendix B-2-4. Appendix B-2-4 has a detailed description of soil and wind erodibility criteria. Studies to determine the actual amount of wind erosion have not been conducted. Therefore, erosion rates by wind are not known at this time.

WATER RESOURCES

Water Use

The total consumptive water use by wild horses and wildlife is 4 acre-feet per year (ac ft/yr), while livestock use is 14 ac ft/yr (Table 2-4).

Since most of the area is without perennial surface water, stock reservoirs have been developed to store spring runoffs for use later in the summer (see Map 2-3). Evaporation losses from the sixteen BLM reserviors that provide livestock water is approximately 69 ac ft/yr (Table 2-4). The evaporation estimate is based on a net evaporation of 47 inches per year (Smith 1974). Storage capacity of the sixteen reservoirs is 88 acre-feet. There are also about twenty private reservoirs which also provide stockwater.

There is no other agricultural or domestic use of water in the Seven Lakes ES area. Water in the area is often used for mineral exploration activities, but the amount used is not known. Stream fisheries within the ES area are very limited (Animals Chapter 2).

Waste water discharges within the ES area include a discharge from a separation plant at Bairoil into Abel Creek, and one by a restaurant at Lamont into an unnamed draw. Another discharge into a tributary of Osborne Draw at T.26N., R.91W., Section 10 is excess water that cannot be used in an oil field injection system. It is of very good quality, but is creating head cutting and erosion problems in the previously dry draw.

Surface Water

The Seven Lakes ES area lies almost entirely (95%) within the Great Divide Basin, a topographically closed basin with no drainage out of it. The remaining 5% of the area is drained by Crooks Creek which is in the North Platte River drainage and is the only stream to leave the ES area. The major streams within the Great Divide Basin portion are Lost Soldier Creek, Bulls Creek, Stewart Creek, Eagles Nest Draw, Lost Creek, and Red Creek. All of these streams drain into playa type lakes or infiltrate into their channels within the ES area. No continuous streamflow gaging stations have been operated within the area.

The streams of the Seven Lakes ES area are ephemeral or intermittent, except for short distances below springs and except for Crooks Creek and Lost Soldier Creek which are the only two streams which can be classified as perennial. The other streams flow in response to snowmelt and intense rainstorms. The runoff of the area is highly variable and dependent on snowpack distribution, depth, and density. Snow in the area is subject to

TABLE 2-3
PRESENT SEDIMENT YIELD

	Allotment								
	Ferris			Stewart Creek			Cyclone Rim		
Soil Map Unit Number	Acres	Sediment Yield Mean*	Sediment Yield (ac ft/yr)	Acres	Sediment Yield Mean*	Sediment Yield (ac ft/yr)	Acres	Sediment Yield Mean*	Sediment Yield (ac ft/yr)
202	2,818	.10	.44	618	.10	.10			
204	5,783	.16	1.45	1,251	.16	.31			
205	225	.16	.06	1,825	.16	.46			
206	1,997	.18	.56	321	.18	.09			
207	1,948	.19	.58	4,805	.19	1.43			
208				4,732	.19	1.40			
209				3,506	.15	.82			
214				344	.12	.06			
301	24,264	.12	4.55	3,571	.12	.67	45,340	.12	8.50
302	1,667	.21	.55	2,081	.21	.68	818	.21	.27
303	4,799	.37	2.77				10,174	.37	5.88
304	722	.20	.23	1,687	.20	.53			
305				66,679	.11	11.46	21,976	.11	3.78
306	3,844	.27	1.62				36,326	.27	15.33

TABLE 2-3 (CONTINUED)
PRESENT SEDIMENT YIELD

	Allotment								
	Ferris			Stewart Creek			Cyclone Rim		
		Sediment Yield			Sediment Yield			Sediment Yield	
Soil Map Unit Number	Acres	Mean*	(ac ft/yr)	Acres	Mean*	(ac ft/yr)	Acres	Mean*	(ac ft/yr)
307	1,825	.09	.26	46,458	.09	6.53	1,390	.09	.20
308	297	.15	.07	42,555	.15	9.97	1,851	.15	.43
310				3,903	.12	.73	43,662	.12	8.19
311							10,742	.25	4.20
312	2,546	.14	.56	4,402	.14	.96	16,077	.14	3.52
313	3,329	.21	1.09	253	.21	.08			
314	3,274	.14	.72						
316							13,445	.18	3.78
317	6,461	.18	1.82						
318	2,546	.10	.40				7,147	.10	1.12
319							10,127	.17	2.69
320							27,658	.15	6.48
321							8,785	.18	2.47
TOTAL	68,345		17.73	188,991	36.28		255,518		66.84

* Mean Sediment Yield - refers to the average sediment yield rate in acre feet per square mile per year.

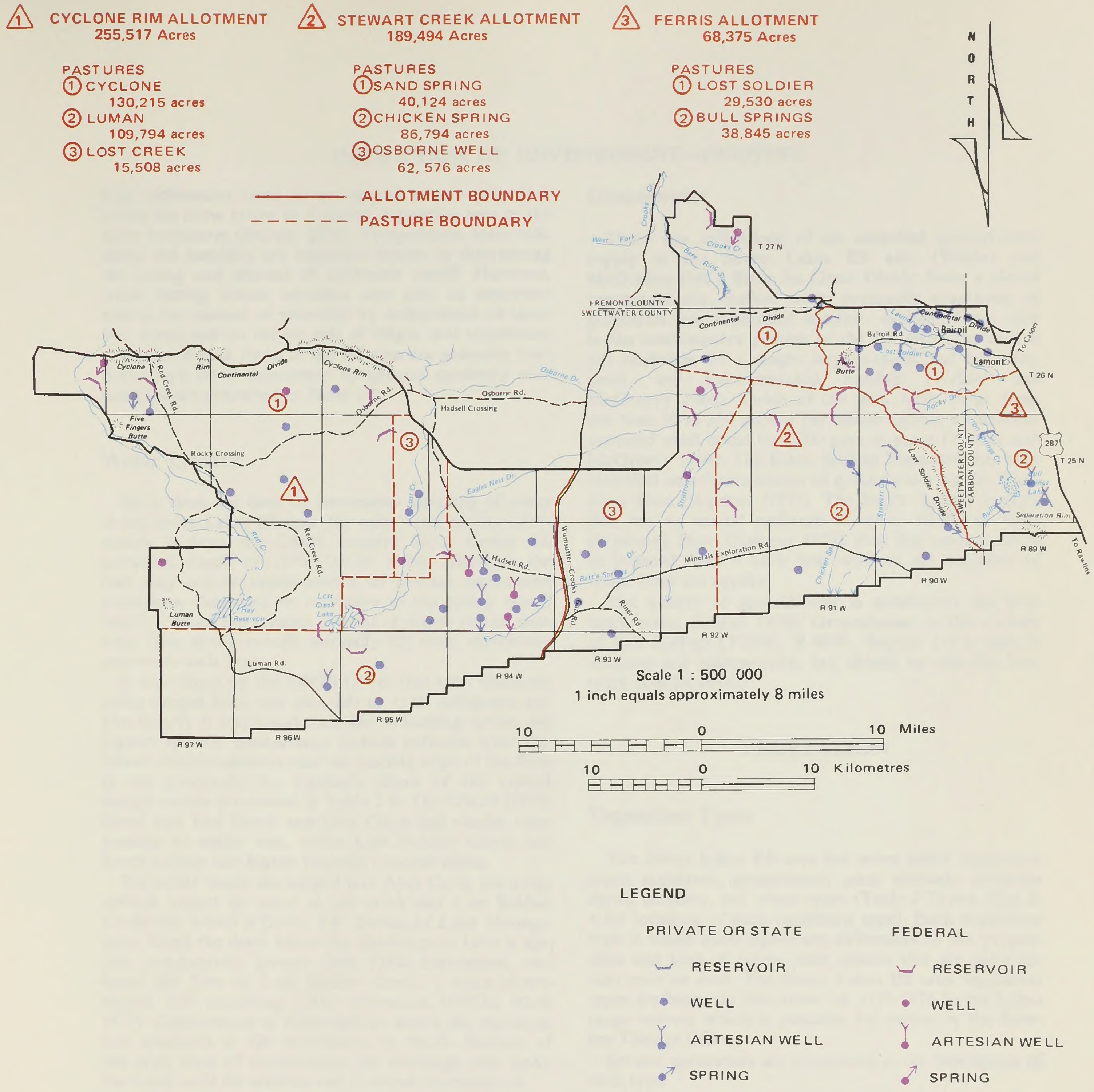
TABLE 2-4
PRESENT WATER CONSUMPTION

	Animal Months	Gallons/ Animal Month	Acre-Feet/Year
Wild Horses	2,880	300*	3
Mule Deer	2,100	12*	< 1
Pronghorn	34,230	12**	1
Cattle	4,669	300*	4
Sheep	107,180	30*	10
Evaporation, (Reservoir)	16 reservoirs	4.3 ac ft/yr***	69
Total			87

*Stoddart, Smith and Box 1975

**BLM Manual 1605, Illustration 12

***Appendix B-2-5



FOOTNOTE :

Indication of a water development does not mean water is availible for use. Most indicated wells do not have pumps. Many reservoirs and springs are not maintained and are ineffective in providing water for livestock or wildlife.

EXISTING WATER DEVELOPMENTS

Seven Lakes Grazing

Environmental Statement

Map 2 - 3

high sublimation rates, so in exposed areas wind either blows the snow cover to a nearby deposition area or the snow sublimates (Sturges 1975). Temperature, solar radiation, and humidity are important factors in determining the timing and amount of snowmelt runoff. However, winds during winter snowfalls also play an important role in the amount of snowmelt by redeposition of snow into draws and on the lee side of ridges, and vegetation.

Expected peak flows of the ES area are generally low. Some peak flows determined by channel geometry relationships are presented in Table 2-5.

Water Quality

Since there has been no continuous sampling of water in the Seven Lakes ES area, the only water quality information is from the USGS samples taken during the snowmelt runoff of 1976 (USGS 1976). Although the data may not be representative of average year-round conditions, they may be indicative of the spring runoff which is when the greatest amount of runoff occurs each year. The spring runoffs normally fill most stockwater reservoirs each year.

It was found by the USGS (1976) that total dissolved solids ranged from less than 100 to 1,000 milligrams per liter (mg/l). It was found that, due to flushing action, the highest specific conductance (which indicates total dissolved solids) occurred near the leading edge of the flow in the previously dry channels. Some of the typical sample results are shown in Table 2-6. The USGS (1976) found that Red Creek and Lost Creek had similar composition of major ions, while Lost Soldier Creek had lower sodium and higher chloride concentrations.

The waste water discharged into Abel Creek has a significant impact on water in the creek and Lost Soldier Creek into which it flows. The Bureau of Land Management found the draw below the discharge to have a specific conductivity greater than 5,000 micromhos, and found the flow in Lost Soldier Creek, 2 miles downstream, still exceeding 5,000 micromhos (USDI, BLM 1977). Conductance at Abel Springs above the discharge was measured at 320 micromhos by BLM. Because of this high level of conductance the discharge may make the water unfit for wildlife and livestock consumption.

Sediment yields for the Seven Lakes ES area are generally very low, and are presented in the Soils Section of Chapter 2.

The USGS collected no fecal coliform data during their study. While monitoring the leading edge of streamflow, livestock and wildlife feces were observed being carried along by the flow. Livestock and wildlife are usually concentrated around surface waters; so fecal coliform levels are expected to be high.

The chemical, biological, and physical characteristics of water affect the use. There are no quality standards for wildlife and livestock consumption, but adverse levels have been determined (McKee and Wolfe 1963). Surface waters of the Seven Lakes ES area are well below these adverse levels and satisfactory for livestock and wildlife watering.

Groundwater

There are indications of an abundant groundwater supply in the Seven Lakes ES area (Welder and McGreevy 1966). Since the Great Divide Basin is closed topographically, surface water eventually evaporates or percolates into subsurface aquifers. Artesian flows exist in the southwestern portion of the ES area. The area is not underlain by a single large aquifer, but by many small, and interconnected aquifers (Welder and McGreevy 1966). Yields of the area wells range from less than 10 to 250 gallons per minute (gpm); a maximum expected yield could be 1,000 gpm or more (Welder and McGreevy 1966). The Battle Springs Formation has been identified as a future source of groundwater by the Wyoming State Engineer (1973). The Battle Springs Formation has an annual recharge of about 20,000 ac ft/yr (Wyoming State Engineer 1973); thus that amount could be pumped from it each year with no net depletion of water from the aquifer.

The quality of groundwater is satisfactory for livestock water (USGS 1976). Groundwater in the vicinity of Bull Springs (T.24N., R.90W., Section 11) is high in uranium and radioactivity, but should be safe for livestock (USGS 1976).

VEGETATION

Vegetation Types

The Seven Lakes ES area has seven major vegetation types: sagebrush, greasewood, grass, saltbush, mountain shrub, meadow, and waste types (Table 2-7) (see Map 2-4 for locations of each vegetation type). Each vegetation type is based upon significant differences in the proportions and kind of native plant species that are predominant over an area. The Seven Lakes ES area vegetation types are based on data from the 1975-1976 Seven Lakes range survey, which is available for review in the Rawlins District Office.

Several parameters are considered in the description of each type:

1. Percent composition—the proportions of various plant species in relation to the total on a given area. The percent composition of the vegetation types was estimated during the 1975-1976 survey.

2. Ground cover—or the amount of ground surface covered by living or dead organic matter on the ground surface and small and large stones. BLM personnel conducted a survey in the fall of 1976. The Wyoming Integrated Study Procedure outlined in BLM Instruction Memo WSO-75-31 was used to determine ground cover (BLM Instruction Memo WSO-75-31 is available for review at the Rawlins District Office).

3. Percent vegetative cover—the amount of ground surface covered by the aerial portions of the vegetation. This information was obtained from the survey mentioned in 2 above.

TABLE 2-5
PEAK FLOWS AS DETERMINED BY CHANNEL GEOMETRY*

Allotment and Stream	Peak Flows in ft^3/sec	
	2 year	5 year
Ferris		
Lost Soldier Creek	200	450
Stewart Creek		
Spring Creek	20	60
Battle Springs Draw	10	40
Cyclone Rim		
Eagles Nest Draw	10	40

* Measurements by BLM personnel and applied to relationships in Techniques for Estimating Flow Characteristics of Wyoming Streams, by H.W. Lowham 1976.

TABLE 2-6
WATER QUALITY*

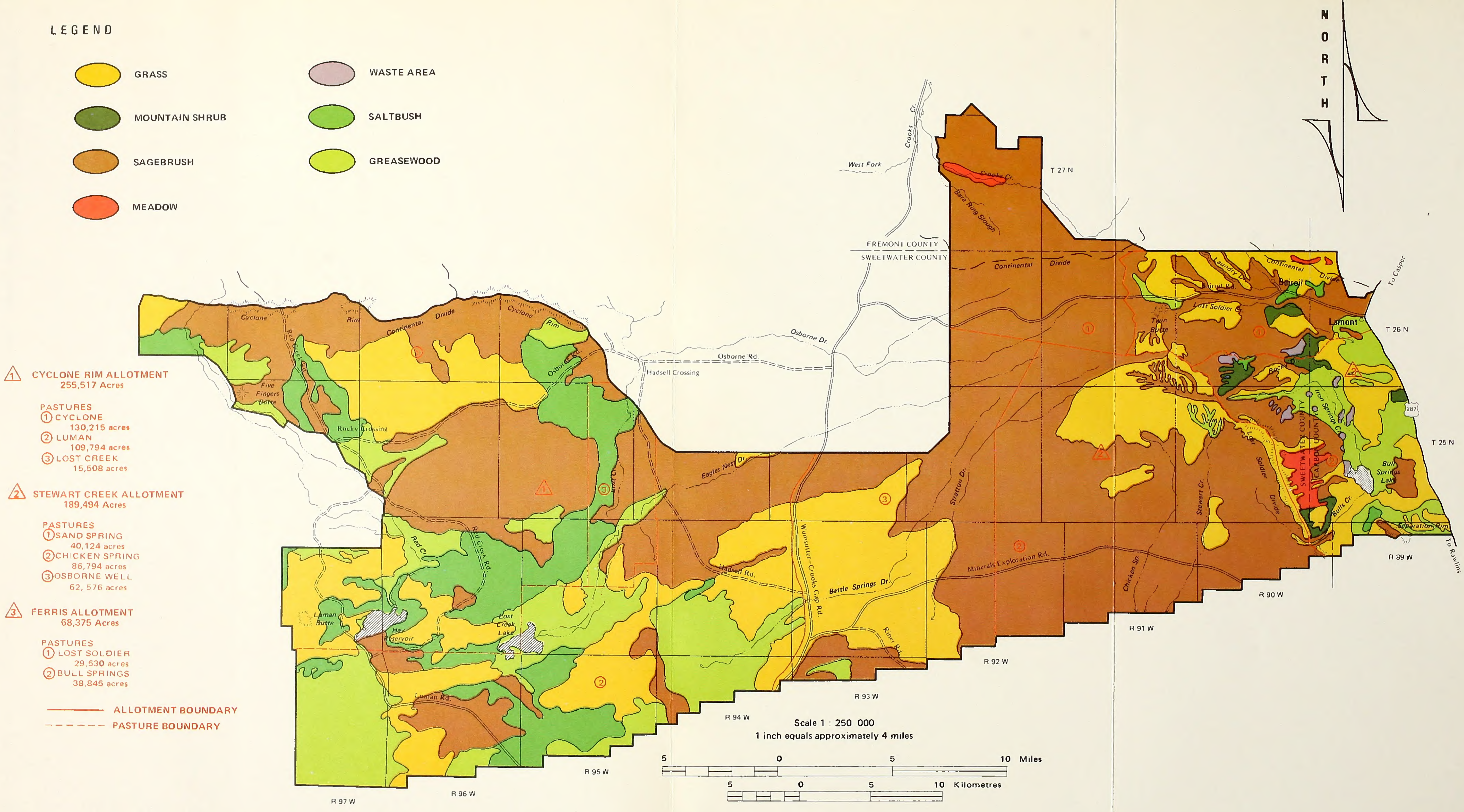
Location	Date	Instantaneous Discharge (cfs)	Suspended Sediment (mg/l)	Turbidity (JTU)	Alkalinity as CaCo^3 (mg/l)	Bicarbonate (mg/l)	Total dissolved Solids (mg/l)	Specific Conductance (micromhos)	pH
Lost Soldier Creek above Lost Soldier Lake	4/6/76	3	6,960	1,200	207	252	1,160	2,200	---
	4/12/76	3.8	4,480	600	171	209	423	780	---
Lost Creek above Lost Lake	4/11/76	15	---	280	75	92	194	327	---
Lost Creek below Eagles Nest Spring	4/2/76	3	1,620	---	133	162	398	610	---
Hay Reservoir	3/25/76	--	---	---	---	274	634	1,020	8.6
Red Creek above Hay Reservoir	3/25/76	20	---	---	105	128	239	295	8.6
	3/25/76	8	1,020	600	107	130	223	440	7.2
Red Creek at Rocky Crossing	3/25/76	19	1,450	600	92	112	158	270	8.6
	4/1/76	7	1,040	700	103	125	222	395	7.2
	4/11/76	7	2,940	1,100	100	122	185	270	---
Red Creek near Five Finger Butte	4/1/76	9.6	1,830	1,100	98	120	201	335	8.1

*Data from USGS Study 1976.

TABLE 2-7
ACREAGE AND PERCENTAGE OF VEGETATION TYPES BY ALLOTMENT AND PASTURE

Allotment and Pasture	Sagebrush Acres	%	Greasewood Acres	%	Grass Acres	%	Saltbush Acres	%	Mountain Shrub Acres	%	Meadow Acres	%	Waste Area Acres*	%	Total Acres
Ferris															
Bull Springs	7,816	20	12,721	33	12,892	33	483	1	866	2	2,860	7	1,207	3	38,845
Lost Soldier	16,229	55	0	0	10,039	34	1,345	5	732	2	315	1	840	3	29,500
Total	24,045	35	12,721	19	22,931	34	1,828	3	1,598	2	3,175	5	2,047	3	68,345
Stewart Creek															
Sand Springs	39,252	99	0	0	0	0	0	0	0	0	276	1	119	<1	39,647
Osborne Well	32,293	52	830	1	29,414	47	0	0	0	0	0	0	39	<1	62,576
Chicken Springs	82,541	95	842	1	3,333	4	0	0	0	0	52	<1	0	0	86,768
Total	154,086	82	1,672	1	32,747	17	0	0	0	0	328	<1	158	<1	188,991
Cyclone Rim															
Lost Creek	8,394	54	1,548	10	660	4	4,906	32	0	0	0	0	0	0	15,508
Luman	31,720	29	40,786	37	32,667	30	3,996	4	0	0	0	0	625	1	109,794
Cyclone	52,725	40	14,970	11	33,897	26	27,057	21	0	0	0	0	1,567	1	130,216
Total	92,839	36	57,304	22	67,224	26	35,959	14	0	0	0	0	2,192	1	255,518
ES TOTAL	270,970	53	71,697	14	122,902	24	37,787	7	1,598	<1	3,503	1	4,397	1	512,854

*Waste areas include excessively steep slopes and sites without vegetation suitable for livestock (e.g. dry lake beds and _Opuntia_ dominated sites).



VEGETATION TYPES
Seven Lakes Grazing
Environmental Statement
Map 2-4

4. Production—the number of acres required to support one animal unit for one month. This information was obtained from the 1975-1976 range survey. The percent ground cover and percent vegetative cover with present production in terms of acres per AUM are listed in Table 2-8 by vegetation type.

Sagebrush Type

The Seven Lakes ES area is dominated by the sagebrush type which covers 270,970 acres or 53% of the area (Table 2-7). This type extends throughout the ES area. Eighty-two percent (154,086 acres) of the Stewart Creek allotment is sagebrush type; while 35% (24,045 acres) and 36% (92,839 acres) respectively of the Ferris and Cyclone Rim allotments are dominated by sagebrush.

The average species composition for the sagebrush vegetation type is 46%, 7%, and 47% for grass, forbs, and shrubs, respectively. Plants commonly found in this type are listed in Table 2-9 (Refer to Appendix B-2-17 for a complete vegetative species list).

Big sagebrush *(Artemisia tridentata)* is the most common constituent of the sagebrush type. Predominant subtypes include black sagebrush *(Artemisia nova)*, bud *sagebrush (Artemisia spinescens)*, and birdfoot sagebrush *(Artemisia* pedatifida). Also included in the sagebrush type is the rabbitbrush subtype which consists mainly of Douglas *rabbitbrush (Chrysothamnus vicidiflorus)* and rubber *rabbitbrush (Chrysothamnus nauseosus)*. The majority of the forage for the livestock and most preferred when accessible, is the understory vegetation. The major grass species in the understory are Indian ricegrass *(Oryzopsis hymen*oides), thickspike wheatgrass *(Agropyron dasystachyum)*, Sandberg bluegrass *(Poa* secunda), needle-and-thread *(Stipa comata)*, bluebunch *wheatgrass (Agropyron spicatum)*, and western wheatgrass *(Agropyron* smithii). On summer ranges or when there is an abundance of other forage plants, sagebrush is sometimes considered to be a nuisance to livestock grazing.

Greasewood Vegetation Type

This vegetation type comprises 14% (71,697 acres) of the ES area. The greasewood vegetation type contributes 19% (12,721 acres) of the acreage of the Ferris allotment, 1% (1,672 acres) to the Stewart Creek allotment and 22% (57,304 acres) to the Cyclone Rim allotment. This type is normally located in narrow gulches and low flats which are heavily impregnated with alkali.

Shrubs, ranging from 42% to 100%, dominate the composition of this vegetation type. The average shrub composition of this vegetation type is 68%. The average grass and forb compositions are 28% and 4%, respectively. Table 2-10 lists the species commonly found within the greasewood vegetation type.

Grass Vegetation Type

This vegetation type contributes 24% (122,902 acres) to the vegetation of the Seven Lakes ES area. The grass vegetation type furnishes 34% (22,931 acres) of the area in the Ferris allotment and 17% (32,747 acres) of the area in the Stewart Creek allotment. Twenty-six percent (67,224 acres) of the vegetation in the Cyclone Rim allotment is the grass type.

Within the grass vegetation type, grass species composition ranges from 19% to 100%, averaging 62% for the entire grass vegetation type. Forbs and shrubs average 8% and 30%, respectively, in the grass vegetation type. Table 2-11 lists the common species found within the grass vegetation type.

Saltbush Vegetation Type

The saltbush vegetation type covers 7% or 37,787 acres of the ES area. Three percent (1,828 acres) of the Ferris allotment is the saltbush vegetation type. There is no saltbush vegetation type within the Stewart Creek allotment and 14% (35,959 acres) of the area in the Cyclone Rim allotment is saltbush. This type is usually confined to long valleys and low alkali flats which are common in the Cyclone Rim allotment.

The average composition of this vegetation type is 40%, 1%, and 59% for grass, forb, and shrub species, respectively. Table 2-12 shows species found within this vegetation type.

Mountain Shrub Vegetation Type

The mountain shrub vegetation type contributes 1,598 acres (less than 1%) to the ES area. All of the mountain shrub vegetation type is found within the boundaries of the Ferris allotment.

The composition of the mountain shrub vegetation type averages 60% shrubs, 34% grass, and 6% forbs. This vegetation type is represented mainly by antelope bitterbrush and is associated with big sagebrush. Table 2-13 shows the species commonly found in the mountain shrub vegetation type.

Meadow Vegetation Type

The meadow vegetation type makes up 1% or 3,503 acres of the ES area. No meadow vegetation is found within the Cyclone Rim allotment; 328 acres are found in the Stewart Creek allotment; and 3,175 acres are found in the Ferris allotment. Both wet and dry meadows have been grouped in this type. The dry site shrubs such as sagebrush and rabbitbrush are more abundant than the wet meadow type. The dry meadow subtype is found around intermittent streams. The wet meadow subtype is found around Crooks Creek in the Stewart Creek allotment and Lost Soldier Creek in the Ferris allotment. Due to the location of existing water sources, these wet meadow areas have received excessive use by cattle. Figure 2-1 shows a comparison of a wet meadow that has been excessively grazed and a wet meadow which has not been overgrazed. It should be noted that riparian habitat has been included within the wet meadow subtype.

Grass and grasslike plants make up the majority (an average of 84%) of the vegetation within the meadow

TABLE 2-8
PRESENT VEGETATIVE COVER, GROUND COVER, AND PRODUCTION BY VEGETATION TYPE FOR THE ES AREA

Vegetation Type	Vegetative Cover* (%)	Ground Cover** (%)	Present Production (Acres per AUM) Cattle	Sheep
Sagebrush	25	57	27	13
Greasewood	17	32	18	9
Grass	23	51	17	8
Saltbush	16	37	16	10
Mountain Shrub	44	60	58	16
Meadow	44	16	9	9

*Vegetative cover is defined as the amount of ground surface covered by the aerial portions of the vegetation.

**Ground cover includes live and dead organic matter, small and large stones.

TABLE 2-9
PLANTS COMMONLY FOUND IN SAGEBRUSH TYPE

Grasses	Forbs	Shrubs	Soil Mapping Units (see Soils section)
Sandberg bluegrass	Phlox	Big sagebrush	202
Thickspike wheatgrass	Wild buckwheat	Nuttall saltbush	204
Bluebunch wheatgrass	Yellow owlclover	Greasewood	205
Indian ricegrass		Douglas rabbitbrush	206
Needle-and-thread		Rubber rabbitbrush	207
Bottlebrush squirreltail		Black sagebrush	208
Western wheatgrass			209
			302
			303
			304
			305
			307
			308
			312
			313
			314
			317
			321

TABLE 2-10
PLANTS COMMONLY FOUND IN GREASEWOOD TYPE

Grasses	Forbs	Shrubs	Soil Mapping Units (see Soils section)
Thickspike wheatgrass	Phlox	Big sagebrush	214
Western wheatgrass	Wild buckwheat	Douglas rabbitbrush	301
Indian ricegrass		Nuttall saltbush	308
Sandberg bluegrass		Greasewood	310
Bottlebrush squirreltail		Bud sagewort	311
			316
			318
			319
			320

TABLE 2-11
PLANTS COMMONLY FOUND IN GRASS TYPE

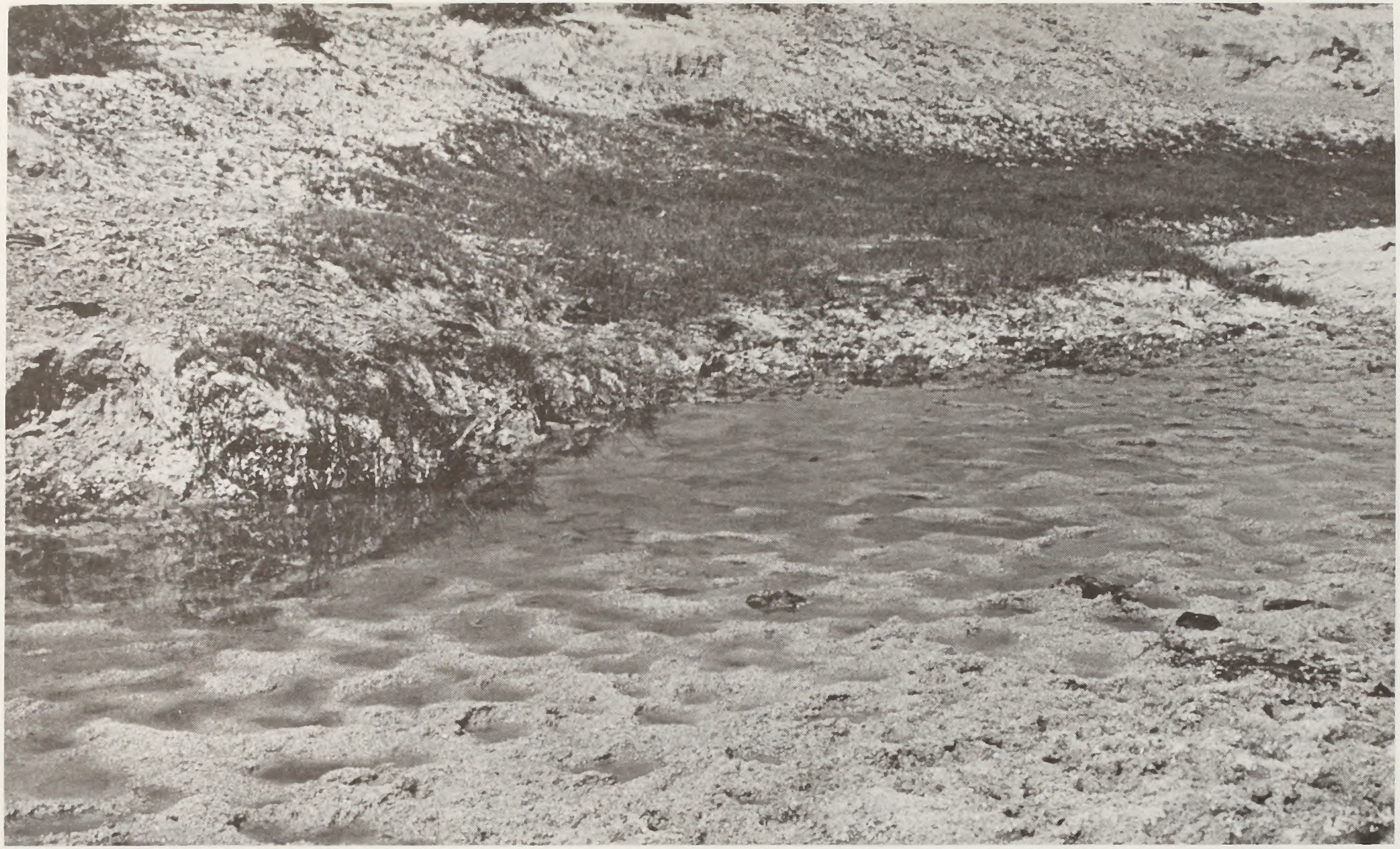
Grasses	Forbs	Shrubs	Soil Mapping Units (see Soils section)
Indian ricegrass	Phlox	Birdfoot sagewort	
Bottlebrush squirreltail	Stemless goldenweed	Nuttall saltbush	
Sandberg bluegrass	Wild buckwheat	Big sagebrush	204
Thickspike wheatgrass		Shadscale saltbush	207
Needle-and-thread		Winterfat	209
Bluebunch wheatgrass		Douglas rabbitbrush	303
			304
			305
			307
			308
			313
			314
			317
			318
			321

TABLE 2-12
PLANTS COMMONLY FOUND IN SALTBUSH TYPE

Grasses	Forbs	Shrubs	Soil Mapping Units (see Soils section)
Bottlebrush squirreltail	Phlox	Nuttall saltbush	
Needle-and-thread		Birdfoot	
Thickspike wheatgrass		Big sagebrush	214
Bluebunch wheatgrass		Bud sagewort	301
		Winterfat	302
			310
			311
			312
			313
			316
			319
			320

TABLE 2-13
PLANTS COMMONLY FOUND IN MOUNTAIN SHRUB TYPE

Grasses	Forbs	Shrubs	Soil Mapping Units (see Soils Section)
Sandberg bluegrass	Stemless goldenweed	Big sagebrush	202
Thickspike wheatgrass	Wild buckwheat	Douglas rabbitbrush	204
Needle-and-thread		Bud sagewort	303
		Antelope bitterbrush	304
			306
			312
			313
			317
			318



OVERGRAZED
MEADOW

Figure 2-1
COMPARISON OF AN OVERGRAZED MEADOW
TO ONE THAT IS NOT OVERGRAZED

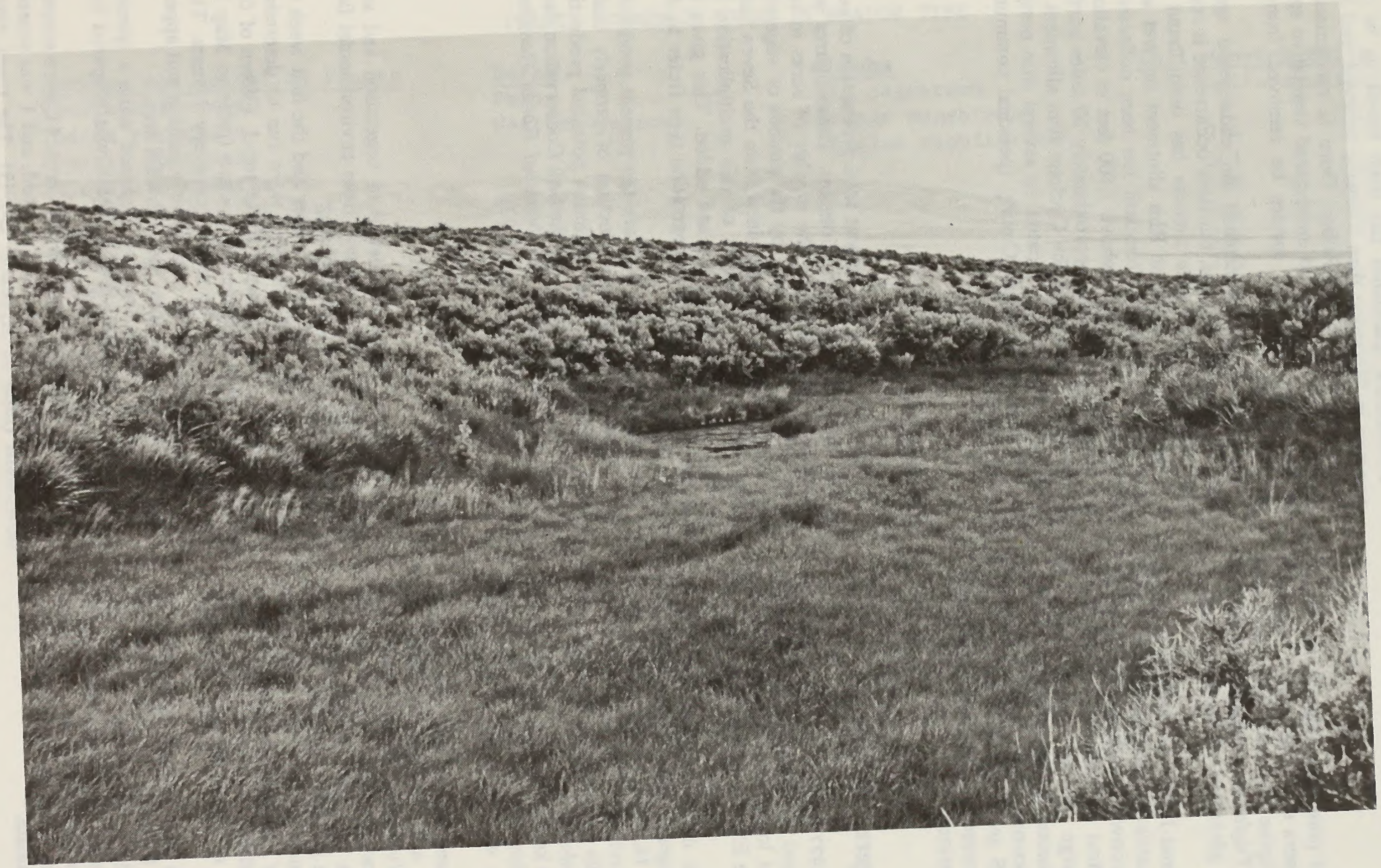


Figure 2-1
COMPARISON OF AN OVERGRAZED MEADOW
TO ONE THAT IS NOT OVERGRAZED

type. Forbs comprise approximately 6%, while shrubs contribute 10% to the vegetation in the meadow type. Table 2-14 shows the species commonly found in the meadow vegetation type.

Poisonous Plants

There are six genera of poisonous plants in the Seven Lakes ES area. These genera are greasewood, halogeton *(Halogeton* glomeratus), lupine *(Lupinus* spp.), locoweed *(Astragalus)*, arrowgrass *(Triglochin maritima)*, and horsebrush *species (Tetradymia glabraton*, *T. canescens*, and *T. spinosa)*.

Greasewood, halogeton, and lupine are known to affect sheep and occasionally cattle. Arrowgrass affects both sheep and cattle, while locoweed and horsebrush affect all classes of livestock. Most poisonous species kill animals only if eaten in large amounts—often almost a straight diet of the poisonous plants (Stoddart, Smith, and Box 1975). The poisonous plants listed above are present throughout the ES area. Problems from poisonous plants are minimal because of the scanty distribution and lack of local concentrations.

Threatened or Endangered Species

During the summer of 1977, the Seven Lakes ES area was surveyed for threatened or endangered vegetative species. The survey did not locate any threatened or endangered species within the ES area and none are known to exist.

Three vegetative species on the federal list of proposed threatened or endangered species *(Federal Registers*, July 1, 1975 and June 16, 1976) are thought to have a good possibility of occurring in the ES area. These three species are *Lesquerella* macrocarpa, *Physaria condensata*, and *Townsendia spathulata*.

Lesquerella *macrocarpa* is known to exist at one site located approximately 20 miles west of the Seven Lakes ES area and may occur in western portions of the ES *area.*

Physaria *condensata* has been located less than 10 miles from the Seven Lakes ES area, growing on limestone ridges near Muddy Gap, Wyoming. *Physaria condensata* in the Muddy Gap region was accessible to livestock and wildlife but did not receive any use. Similar limestone ridges are located within the ES area; therefore, it would be possible for *Physaria* condensata to exist within the Seven Lakes ES area. Use *of Physaria condensata* by livestock, wild horses, and wildlife, if it were found in the ES area, would be the same as on the Muddy Gap *population.*

Townsendia *spathulata* has been located approximately 25 miles north of the Seven Lakes ES area on limestone ridges. Similar limestone ridges are located within the ES area; therefore, it is possible for *Townsendia spathulata* to occur within the Seven Lakes ES area. The limestone ridges within the ES area have not specifically been checked for *Townsendia* spathulata.

In the areas located, *Townsendia spathulata* was accessible to livestock and wildlife but did not show any evidence of grazing pressure. *Townsendia spathulata*, if found within the ES area, would be expected to receive the same amount of use as mentioned *above.*

Townsendia *spathulata* has been found to be more common in Wyoming than formerly believed, and it has been suggested by Dr. Robert Dorn (a recognized authority on threatened and endangered vegetative species in Wyoming) that this species be removed from the threatened list.

Three additional threatened or endangered species may occur in the ES area, but their occurrence is considered unlikely. *Antennaria arcuata* has been found just northwest of the Cyclone Rim allotment on wet sedge hummocks. *Lesquerella* fremontii has been collected on calcareous gravel ridges above 7,500 feet in elevation in the foothills scrub zone approximately 20 miles north of the northwest corner of the Cyclone Rim allotment. *Artemisia porteri* has been located on several sites north of the ES area in Fremont County (personal communication, Robert Dorn).

Production

Table 2-15 shows the present total production of vegetation in pounds for each allotment. These figures were determined by multiplying the number of acres in each range survey write-up type by the pounds of vegetation (dry weight) per acre determined from the Seven Lakes range survey. The products of this multiplication are grouped by vegetation type and added. This gives the number of pounds for that vegetation type (refer to Appendix B-2-7).

Also shown in Table 2-15 are the present production and maximum potential production of properly usable winter sheep AUMs. The maximum potential production was calculated through using the Soil Conservation Service method described in *the National Range Handbook* (see Appendices B-2-2 and B-2-22).

Trend

Range trend refers to change in vegetation and soil characteristics resulting directly from environmental factors, primarily climate and grazing.

During the last week of October and the first week of November of 1976, 46 transects were run to determine range condition and apparent range trend. Fifteen of the 46 transects were permanently marked (refer to Map 2-5). The transects will be read once every 3 years. The transects were located to obtain the condition and apparent trend information from the entire ES area.

The apparent range trend was scored using a special form (refer to Appendix B-2-9) which was prepared for the Seven Lakes ES area.

Of the 46 transects run in the ES area, 41 were scored in a stable trend, 4 in an upward trend, and 1 was scored downward (refer to Appendix B-2-19). The trend data,

TABLE 2-14
PLANTS COMMONLY FOUND IN MEADOW TYPE

Grasses and Grasslike Plants	Forbs	Shrubs	Soil Mapping Units (see Soils section)
Needle-and-thread	Phlox	Big sagebrush	
Indian ricegrass	Western yarrow	Fringe sagebrush	
Prairie junegrass		Douglas rabbitbrush	214
Thickspike wheatgrass			301
Kentucky bluegrass			310
Sandberg bluegrass			311
Rushes			316
Sedges			319
			320

TABLE 2-15
PRESENT AND POTENTIAL PRODUCTION BY ALLOTMENT[1]

Allotment	Present Total Production of Vegetation (Pounds Air Dry)[2]	Present Production of Forage in Terms of Properly Usable Winter Sheep AUMs and lbs[3]		Maximum Potential Production of Forage in Terms of Winter Sheep AUMs and lbs[4]	
		AUMs	Pounds	AUMs	Pounds
Ferris	11,335,146	5,625	2,531,250	12,766	5,744,700
Stewart Creek	31,958,032	19,710	8,869,500	38,887	17,499,150
Cyclone Rim	57,171,853	35,285	15,878,250	46,804	21,061,800
TOTAL	100,465,031	60,620	27,279,000	98,457	44,305,650

Present Consumptive Use
AUMs/Pounds

	Livestock[5]											
	Summer Cattle		Winter Sheep		Summer Sheep		Wildlife[6]		Wild Horses[7]		Total	
Allotment	AUMs	Pounds	AUMs	Pounds	AUMs	Pounds	AUMs	Pounds	AUMs	Pounds	AUMs	Pounds
Ferris	209	163,020	3,335	1,500,750	-	-	155	458,568	90	280,800	3,789	2,403,138
Stewart Creek	1,115	869,700	1,626	731,700	-	-	304	958,716	627	1,965,600	3,672	4,525,716
Cyclone Rim	3,345	2,609,100	14,637	6,586,650	1,838	1,378,500	304	958,716	110	345,600	20,234	11,878,566
Total	4,669	3,641,820	19,598	8,819,100	1,838	1,378,500	763	2,376,000	827	2,592,000	27,695	18,807,420

TABLE 2-15 (CONTINUED)
PRESENT AND POTENTIAL PRODUCTION BY ALLOTMENT

1 The Stewart Creek and Cyclone Rim allotments listed in the table are presently a portion of the existing Seven Lakes incommon allotment.

2 From 1975-1976 weight estimate survey. See Appendix B-2-7 for methodology.

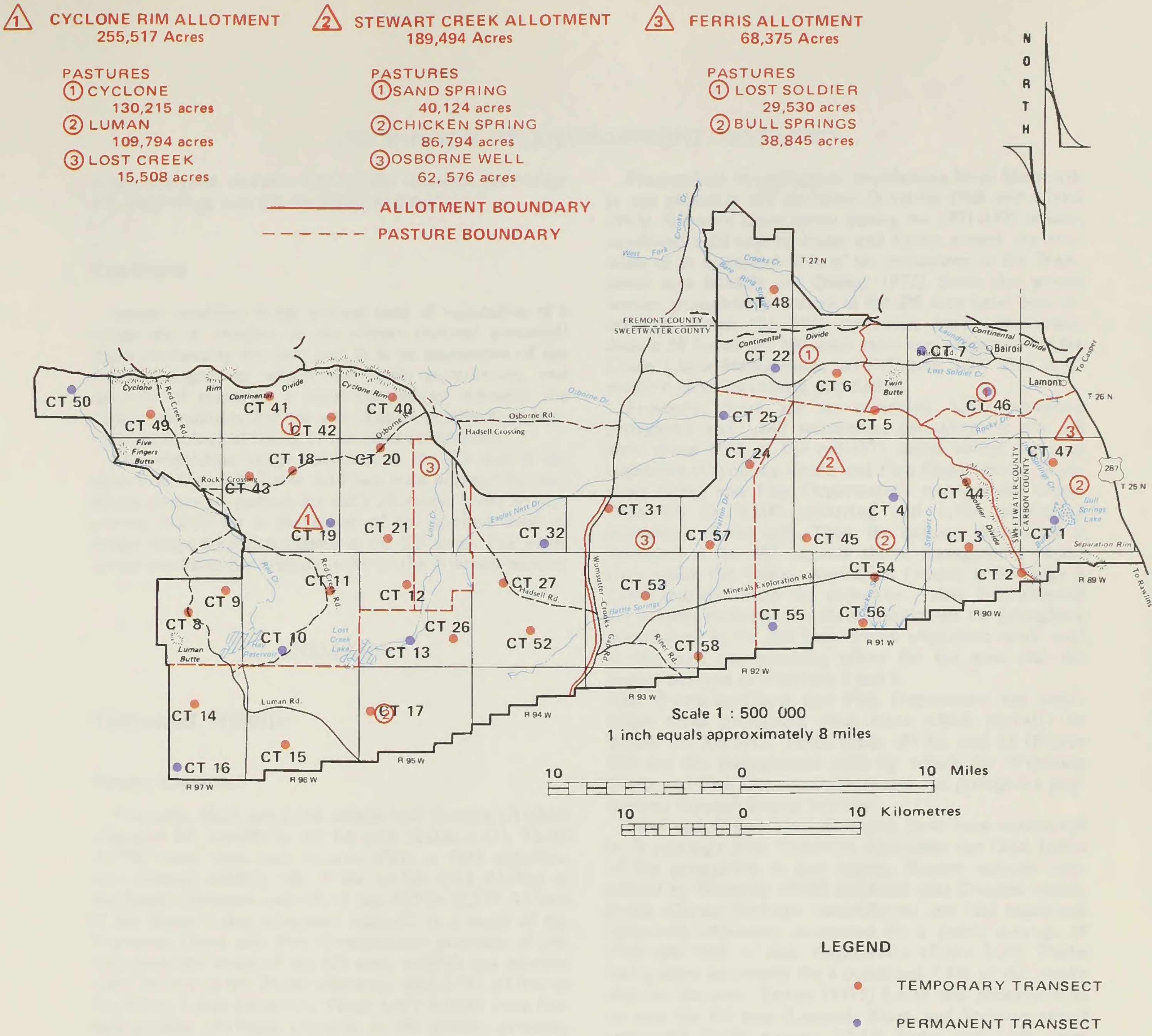
3 The pounds of forage displayed in this column are not comparable to the proposed pounds of forage consumption shown in Table 1-4. The present production shown above is in terms of winter sheep use, and the proposed pounds of forage consumption in Table 1-4 are in terms of actual forage consumed by the various kinds of grazing animals.

4 From Soil Conservation Service method described in National Range Handbook (refer to Appendix B-2-22 for the methodology used in calculating the maximum potential production by allotment).

5 Livestock use is the average active use over the last 5 years, both authorized and estimated unauthorized drift.

6 Based upon population numbers in Table 2-19 and methodology in Appendix B-1-1. AUMs are on a winter sheep basis (refer to Appendix B-2-7).

7 On August 17, 1977, an aerial inventory of wild horses showed 26 in the Ferris allotment, 182 in the Stewart Creek allotment, and 32 in the Cyclone Rim allotment. AUMs are on a winter sheep basis.



LOCATION OF CONDITION
TREND TRANSECTS

Seven Lakes Grazing

Environmental Statement

Map 2 - 5

when analyzed, showed 90% of the transects are stable, 8% improving, and 2% declining in trend.

Condition

Range condition is the present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble the climax community for the site. Range condition is basically an ecological rating of the plant community.

The vegetation range condition in the ES area is depicted on Map 2-6. Table 2-16 lists total acreage by condition classes by pasture for each allotment (refer to Appendix B-2-10 for a discussion of the method used to assign range condition classes in the ES area). For vegetation condition for wildlife, refer to the Animals section.

ANIMALS

Terrestrial Wildlife

Forage Allocations

Presently, there are 6,688 animal unit months (AUMs) allocated for wildlife in the ES area (Table 2-17). These AUMs come from two sources. First, a 1958 adjudication allowed wildlife 5% of the AUMs (358 AUMs) in the Ferris allotment and 4% of the AUMs (2,379 AUMs) in the Seven Lakes allotment. Second, as a result of the Wyoming Game and Fish Commission's purchase of private property south of the ES area, wildlife has another 1,000 AUMs in the Ferris allotment, and 2,951 AUMs in the Seven Lakes allotment. These 3,951 AUMs were federal grazing privileges attached to the private property south of the ES area. Thus, the present total allocation for wildlife is 1,358 AUMs in the Ferris allotment, and 5,330 AUMs in the Seven Lakes allotment, for a total allocation of 6,688 AUMs.

However, with the extensive livestock nonuse, there are 1,991 AUMs in the Ferris, and 31,697 AUMs in the Seven Lakes which are available for wildlife use. This represents a total of 33,688 AUMs available for wildlife (Table 2-18). Since management objectives for pronghorn and mule deer in the area require only 1,325 AUMs (Table 1-4), there are presently 32,363 AUMs available for wildlife other than pronghorn and mule deer.

Pronghorn

Populations. The pronghorn *(Antilocapra americana)* is presently the most conspicuous wildlife species in the Seven Lakes ES area. This herbivore is highly specialized for living in open country (Kitchen 1974) such as the Red Desert.

Fluctuations in pronghorn populations have historically and presently still do occur (Yoakum 1968 and Allred 1943). A severe snow storm during the 1971-1972 winter, combined with natural losses and fences caused the mortality of an estimated 62% of the pronghorn in the Wamsutter area (Riddle and Oakley 1972). Since that severe winter, pronghorn numbers in the ES area have been increasing. From the 1976 preseason herd composition data, a 54 fawns per 100 adult ratio was estimated for the Chain Lakes Management area (Figure 2-2). This is indicative of an increasing population.

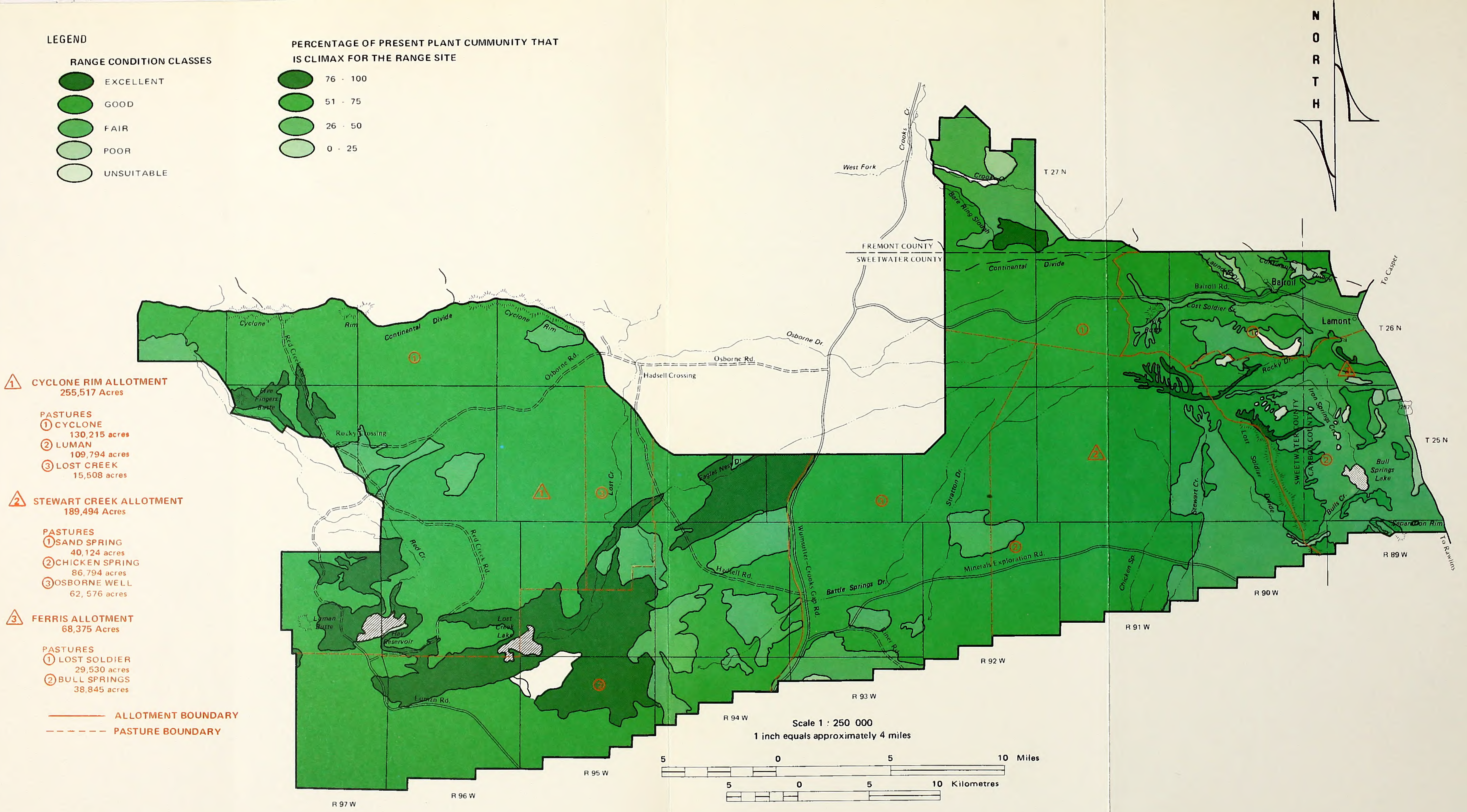
Presently, there are an estimated 3,800 wintering pronghorn and 1,845 summering pronghorn in the ES area, about 50% of the pre-1971 storm winter carrying capacities (Wyoming Game and Fish Department). Wyoming Game and Fish Department's management objectives are for 5,000 wintering and 1,339 summering pronghorn in the unit. Thus, the summer population is estimated to be 465 animals above management objectives while the winter population (which is limiting) is 1,200 animals below the objective. Table 2-19 presents the present estimates and future objectives for pronghorn populations in the ES area. These objectives were used in the land use planning effort for the area and the impact analysis in Chapters 3 and 8.

The Wyoming Game and Fish Department has established three pronghorn hunt areas which partially lie within the ES area. These areas, 60, 61, and 64 (Figure 2-2) are the management units by which the Wyoming Game and Fish Department manages the pronghorn populations through hunter harvest.

Food and Cover. Several studies have been conducted in Wyoming's Red Desert to determine the food habits of the pronghorn in that region. Rumen analysis conducted by Severson (1966) indicated that Douglas rabbitbrush *(Chryso thamnus* viscidiflorus) and Big sagebrush *(Artemisia tridentata)* accounted for a yearly average of 17% and 73% of diet, respectively (Table 2-20). Forbs and grasses accounted for a combined 7.9% of the yearly diet for the year. Taylor (1975) found that pronghorn in or near the ES area (Lamont, Riner, and Seminoe areas) consumed 75.8% browse, 17.1% forbs, and 7.1% grass on a yearly average (Table 2-21). Comparisons between food habits and seasonal plant availability were also made (Figure 2-3). These data indicate that pronghorn food consumption is influenced by both availability and preference (Taylor 1975). As forbs and grasses become more available in the spring and summer, they appear as a greater portion of the diet.

The diet similarity index comparing pronghorn to cattle, sheep and wild horses is presented in Table 2-22. These values, derived by fecal analysis (Hansen 1975), represent the portion of the pronghorn diet which is common to the animals. This overlap is an indicator of the amount of forage competition that would occur when the two animals occupy the same range during the same or different seasons.

The sagebrush, open grasslands, greasewood, and saltbush of the Seven Lakes (98%—503,356 acres) ES area appear to meet the cover requirements for successful pronghorn populations. During the summer and fall seasons, most open habitats afford the cover needed for



VEGETATION
RANGE CONDITION

Seven Lakes Grazing

Environmental Statement

Map 2 - 6

TABLE 2-16
ACREAGE IN EACH CONDITION CLASS* BY ALLOTMENT AND PASTURE

Allotment & Pasture Name	Poor	Fair	Good	Excellent
Ferris				
Lost Soldier	1,007	12,818	14,032	488
Bull Springs	1,379	21,148	14,337	774
Stewart Creek				
Osborne Well	199	7,922	54,416	0
Sand Springs	1,612	9,885	24,189	3,812
Chicken Springs	108	16,611	68,925	1,115
Cyclone Rim				
Cyclone	0	10,592	99,462	18,586
Luman	0	14,927	71,444	22,367
Lost Creek	0	2,393	10,907	2,208
TOTAL**	4,305	96,296	357,712	49,350

*

Range Condition Class	Percentage of Present Plant Community that is Climax for the Range Site
Excellent	76-100
Good	51-75
Fair	26-50
Poor	0-25

Appendix B-2-10 indicates how the condition classes were determined.

**The total acreage by condition class does not equal the ES area total acreage because field write-ups were not completed for several waste areas and, therefore, the condition could not be determined on those areas.

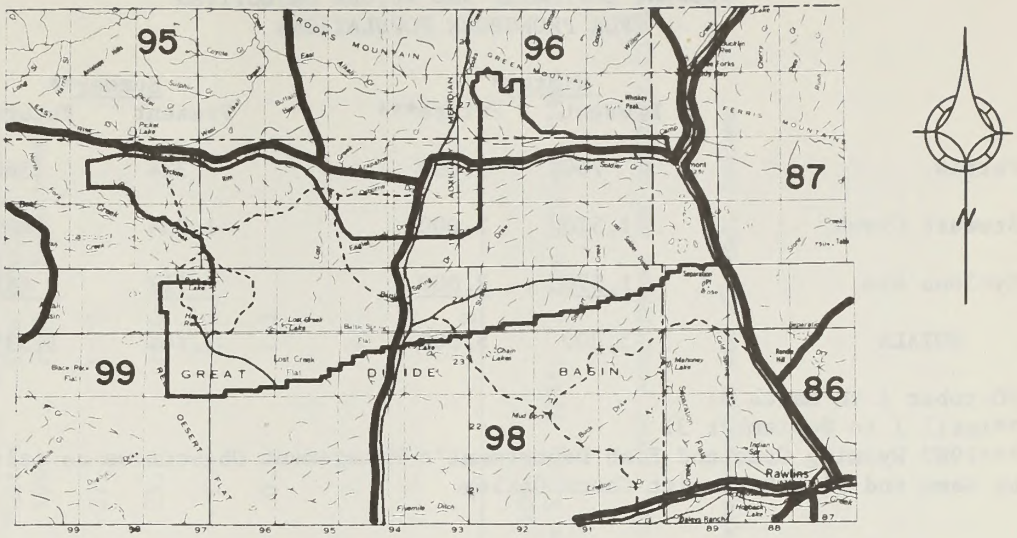
TABLE 2-17
FORAGE ALLOCATED FOR WILDLIFE IN ES AREA

Allotment	Percent of Available Forage	Allocation To Wildlife	Base Property	Total
Ferris incommon	5%	358 AUMs	1,000 AUMs	1,358 AUMs
Seven Lakes incommon	4%	2,379 AUMs	2,951 AUMs	5,330 AUMs
Total				6,688 AUMs

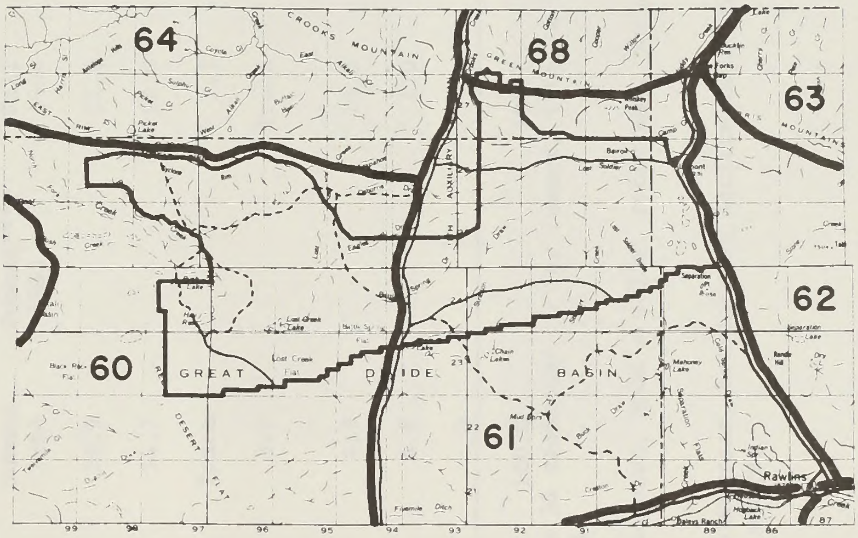
TABLE 2-18
FORAGE PRESENTLY AVAILABLE FOR WILDLIFE*

	Present Production	Present Livestock and Wild Horse Use	Forage Available to Wildlife**
Ferris	5,625	3,634	1,991
Seven Lakes	54,995	23,298	31,697
TOTAL ES AREA, EXCLUDING FERRIS ALLOTMENT	60,620	26,932	33,688

*All figures are expressed in AUMs from Table 2-15.
**Forage available = Present production - present livestock and wild horse use.



MULE DEER HUNT AREAS



ANTELOPE HUNT AREAS

LEGEND

60 TABLE ROCK MANAGEMENT UNIT
61 CHAIN LAKES MANAGEMENT UNIT

Figure 2 – 2

HUNT AREAS FOR ANTELOPE AND MULE DEER IN THE SEVEN LAKES

TABLE 2-19
PRESENT ESTIMATES AND FUTURE OBJECTIVES FOR PRONGHORN POPULATIONS

	Winter*		Summer**	
	Present	Future***	Present	Future***
Ferris	760	1,000	324	360
Stewart Creek	1,520	2,000	1,004	490
Cyclone Rim	1,520	2,000	517	489
TOTALS	3,800	5,000	1,845	1,339

*October 1 to March 31
**April 1 to September 31
***1980 Wyoming Game and Fish Department's Management Objectives as calculated by Game and Fish Biologist Chuck Oakley

TABLE 2-20
SEASONAL FORAGE CONSUMPTION BY ANTELOPE
DETECTED BY STOMACH CONTENT ANALYSIS,
1964 AND 1965.* (Percent by volume)

Species	Summer 1964	Summer**** 1965	Fall 1964	Fall 1965	Winter 1964	Winter 1965	Year Average 1964	1965*****
Douglas rabbitbrush	29.9		22.6	33.0	7.3	17.2	17.0	
Big sagebrush	54.7		57.9	39.8	90.4	65.2	73.0	
Winterfat	Trace		1.7	1.2	0.6	1.9	0.8	
Brown sagebrush (Birdfoot sagewort)	3.7		Trace	.0	Trace	0.1	1.3	
Forbs**	4.9		16.8	1.8	Trace	1.7	4.7	
Grasses and Sedges***	6.8		1.0	9.8	1.7	3.9	3.2	
Unidentified Material	.0		.0	14.3	.0	9.9	.0	
TOTAL	100.0		100.0	100.0	99.9	100.0		

*Averages derived from 34 stomachs: 8 for Summer, 1964; 4 for Fall, 1964; 2 for Fall, 1965; 12 for Winter, 1964: and 8 for Winter, 1965.

**Included cushion eriogonum, Hood's phlox, rockcress, pursh loco, Russian thistle, sand penstemon, and unidentified forbs.

***Included Sandberg bluegrass, bottlebrush squirreltail grass, western wheatgrass, needle-and-thread, Indian ricegrass, and obtuse sedge.

****None collected.

*****No data (summer samples not collected).

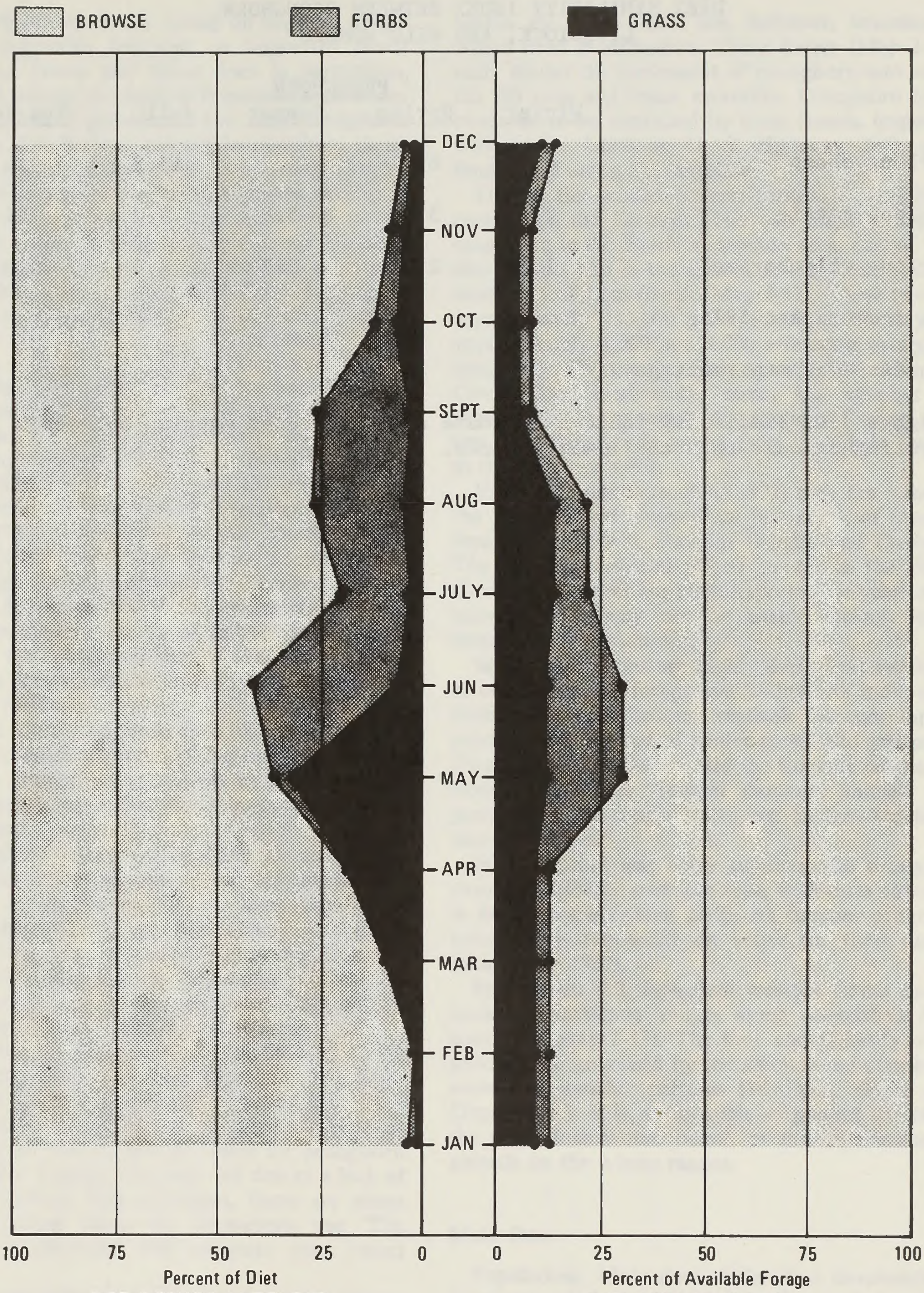
From Severson (1966)

TABLE 2-21
PERCENT OF PLANTS IN THE DIET OF PRONGHORNS ON THE RED DESERT

Forage Class	Plant	Season				Weighted Average*
		Spring	Summer	Fall	Winter	
Browse	Big sagebrush	25.2	21.6	51.0	69.1	49.3
	Rabbitbrush	4.8	18.9	11.0	8.6	10.3
	Nuttall saltbush	0.6	0.7	9.1	12.8	7.8
	Birdfoot sagewort	9.7	10.2	3.6	0.9	4.6
	Black greasewood	0.9	4.4	0.8	0.0	1.1
	TOTAL	48.0	59.8	78.2	91.8	75.8
Forbs	Plains pricklypear	T**	4.3	7.8	0.1	2.7
	Woody aster	0.7	8.5	2.4	T	2.1
	Bushy birdbeak	0.7	5.2	3.6	0.0	1.9
	Penstemon	7.3	2.6	0.3	T	1.7
	Ballhead sandwort	9.8	T	0.0	0.0	1.6
	Thistle	1.7	2.3	1.0	T	0.9
	TOTAL	34.6	38.4	17.6	1.3	17.1
Grass		17.4	1.8	4.2	6.9	7.1

*Weighted to 2 months spring, 2 months summer, 3 months fall, and 5 months winter.
**T is less than .01. Only the twelve important plants are listed by species, but totals for each class include the amount of all plants in the diet.

From: Wildlife Technical Report #3 Elroy Taylor (1975).



RED DESERT ANTELOPE
FOOD HABITS BY FORAGE CLASS
AS DETERMINED FROM
RUMEN ANALYSES

RED DESERT SEASONAL
PLANT AVAILABILITY BY
FORAGE CLASS

From Wildlife Technical Report Number 3 Taylor (1975).

Figure 2 – 3

COMPARISON BETWEEN FOOD HABITS AND PLANT AVAILABILITY

TABLE 2-22
DIET SIMILARITY INDEX BETWEEN PRONGHORN, LIVESTOCK, AND WILD HORSES*

	PRONGHORN				
	Winter	Spring	Summer	Fall	Yearlong
Yearlong sheep	4.5**	6.7	11.3	15.3	9.4
Yearlong cattle	2.4	3.0	5.0	7.3	4.4
Yearlong wild horses	1.0	2.0	3.7	4.6	2.8

Data from Hansen 1975

*Expressed as a percentage.

**Higher diet similarity indices indicate a greater diet overlap between competing animals than the lower indices.

these animals. However, in the spring on fawning ranges (Table 2-23), sagebrush becomes an important cover plant to conceal fawns and those does in parturition, while forbs and grasses are used as important food items.

Winter is a critical period for the area pronghorn. Severe weather forces these animals to distribute themselves according to food and cover availability (Taylor 1975). During this period, sagebrush becomes an important plant affording pronghorn both food and cover. Bare windswept ridges offering available forage are often concentration points. Forage height becomes an important plant characteristic of food availability depending on snow depth and wind conditions. Some 155,129 acres (Table 2-23) are classified as crucial winter ranges.

The ES area appears to be able to adequately supply the necessary food and cover required for both the wintering and summering pronghorn. The condition of the vegetation in the ES area was rated as to its ability to meet these requirements (Appendix B-2-8). On the summer range (the whole ES area), 41,137 acres (8% of the ES area) were rated as in good vegetative condition; 358,159 acres (70%) were rated in fair condition; and 113,558 acres (22%) were rated in poor condition. On the winter ranges (refer to Pronghorn Distributions and Migrations), 12,563 acres (8% of the winter range) were rated in good vegetative condition; 127,173 acres (82%) were rated in fair condition; and 15,393 acres (10%) were rated as in poor condition. Table 2-24 and Maps 2-7 and 2-8 present this data.

The apparent trend (Appendix B-2-16) of the vegetation to meet the requirements of pronghorn is shown on Map 2-9. Two sites appeared to be in an improving trend, 21 appeared to be stable, and 12 appeared to be in a downward trend.

Water. During the later portion of the summer, water may be the major environmental factor determining the distribution of pronghorn in the ES area. Sundstrom (1967) found that 95% of the Red Desert pronghorn were within 3 to 4 miles of water. Water was a critical factor from early July until the beginning of October. During the spring and early summer, water is not critical since it is largely available over the entire area.

Presently, there are large areas in the Stewart Creek and Cyclone Rim allotments where water may be a limiting factor in the summer distribution of pronghorn (Map 2-10). In the Stewart Creek allotment, there are approximately 92,700 acres which are unavailable for pronghorn use during the late summer and early fall due to a lack of water. In the Cyclone Rim allotment, there are about 119,800 acres lacking water for pronghorn use. The Ferris incommon allotment has adequate year round water.

Distributions and Migrations. The most unique characteristic of pronghorn is their migratory nature. The Red Desert herd is reported to have the world's largest herd of migratory pronghorn (personal communication Wyoming Game and Fish Department). Yearly spring and fall migrations occur between winter and summer ranges. Distances of up to 40 miles have been recorded for some marked animals (Wyoming Game and Fish Department 1967). The ES area presently does not have any interior fences which restrict the movement of these animals within the area. There are, however, boundary fences which need modification. These fences (Map 2-11) presently hinder the movement of pronghorn into and out of the ES area and cause mortality. Pronghorn have been observed to be restricted by these fences, (especially the woven-wire fence on U. S. Highway 287), and even found dead along the fencelines.

During the winter, several thousand pronghorn concentrate in the ES area. The two major crucial winter ranges are in the Ferris incommon area, east of Lost Soldier Divide, and in the area from the Chain Lakes to the south end of Lost Creek (Map 2-12). These two areas of approximately 155,000 acres (Table 2-23) may support approximately 1,000 and 4,000 wintering pronghorn, respectively (Wyoming Game and Fish Department). Cover, food availability, snow, and weather patterns largely govern the winter distributions. During mild winters, the animals may winter from the Chain Lakes north to the Antelope Hills.

In severe winters (such as 1972) they are forced out of the ES area and concentrate just north of Interstate 80 from Wamsutter to Rawlins (Riddle and Oakley 1972). The identified crucial winter ranges in the Ferris and Chain Lakes areas are most important in years of normal snowfall, but may not be usable during abnormally severe winter conditions.

Spring migrations are highly dependent on the weather conditions and forage availability. As snow melts and forbs and grasses become available for consumption, the pronghorn move out of winter areas onto summer ranges throughout the ES area, and the summer ranges near the Sweetwater River. Several thousand animals may migrate from the Chain Lakes up to the Antelope Hills summer ranges.

In the spring and early summer, the pronghorn are evenly distributed over the area, with does concentrating in fawning areas (Map 2-12). As summer progresses the animals are dependent on water for their distribution (Sundstrom 1967).

In the later fall, inclement weather forces the animals back to the winter ranges along established migration corridors (Map 2-13). The time and intensity of the migrations are governed by the amount and distributions of snow and weather patterns (Wyoming Game and Fish Department). It is not possible to predict the exact time the migrations would occur, or the distributions of the animals on the winter ranges.

Mule Deer

Populations. Mule deer *(Odocoileus hemionus)* populations are relatively low in the Seven Lakes ES area. These animals are largely confined to the south slopes of Green Mountain, along Lost Soldier Divide, and an area west of the Luman Ranch (Map 2-14). Present populations and Wyoming Game and Fish Department's population management objectives are for approximately 25 mule deer in the Ferris allotment, 75 in the Stewart Creek, and 75 in the Cyclone Rim (Table 2-25).

The Wyoming Game and Fish Department has established three mule deer hunt areas which partially lie

TABLE 2-23
SELECTED PRONGHORN HABITAT BY PASTURE

	Pronghorn Crucial Winter		Pronghorn Fawning	
Ferris Allotment	Acres	Percent*	Acres	Percent*
Bull Springs	35,188	91	1,880	5
Lost Soldier	20,988	71	5,040	17
Allotment	56,176	82	6,920	10
Stewart Creek				
Chicken Springs			17,880	21
Sand Springs			10,800	27
Osborne Well	24,987	40	17,880	29
Allotment	24,987	13	46,560	25
Cyclone Rim				
Luman	46,601	42	10,960	10
Cyclone	19,870	14	4,400	3
Lost Creek	7,495	46	6,200	40
Allotment	73,966	28	21,560	8
ES Total	155,129	30	75,040	15

*The percent of the total pasture or allotment acreage.

TABLE 2-24
PRONGHORN HABITAT CONDITION*

	Pronghorn Crucial Winter						Pronghorn Summer (Entire ES Area)					
	Good		Fair		Poor		Good		Fair		Poor***	
	Acre	%**	Acre	%**	Acre	%**	Acre	%**	Acre	%**	Acre	%**
Ferris Allotment												
Bull Springs	4,127	(12)	26,567	(76)	4,494	(13)	1,246	(3)	21,435	(55)	16,164	(42)
Lost Soldier	8,436	(40)	12,030	(57)	522	(3)	264	(1)	18,501	(63)	10,735	(36)
TOTAL	12,563	(22)	38,597	(69)	5,016	(9)	1,510	(2)	39,936	(58)	26,899	(39)
Stewart Creek												
Chicken Spring	0		0		0		21,324	(25)	53,836	(62)	11,608	(13)
Sand Spring	0		0		0		3,764	(9)	35,764	(91)	119	(<1)
Osborne Well	0		23,603	(94)	1,384	(6)	8,717	(14)	50,462	(81)	3,397	(5)
TOTAL	0		23,603	(94)	1,384	(6)	33,805	(18)	140,062	(74)	15,124	(8)
Cyclone Rim												
Cyclone	0		15,370	(77)	4,500	(23)	5,822	(4)	101,091	(78)	23,303	(18)
Lost Creek	0		6,695	(89)	800	(11)	0		8,503	(55)	7,005	(45)
Luman	0		42,908	(92)	3,693	(8)	0		68,567	(62)	41,227	(38)
TOTAL	0		64,973	(88)	8,993	(12)	5,822	(2)	178,161	(70)	71,535	(28)
ES Total	12,563	(8)	127,173	(82)	15,393	(10)	41,137	(2)	358,159	(70)	113,558	(22)

*See Appendix B-2-8 for methodology.
**Percent of habitat of pasture, allotment, or ES area in that condition class.
***Includes dry lake beds.

Good - a vegetative type where the plant community provides pronghorn with the best possible plant conditions and components to meet their habitat needs.

Fair - a vegetative type where the plant community provides pronghorn with the majority of habitat needs but not at the optimum.

Poor - a vegetative type where the plant community does not provide pronghorn with a majority of their habitat needs or the community lacks an important component to support pronghorn.

⚠1 **CYCLONE RIM ALLOTMENT**
255,517 Acres

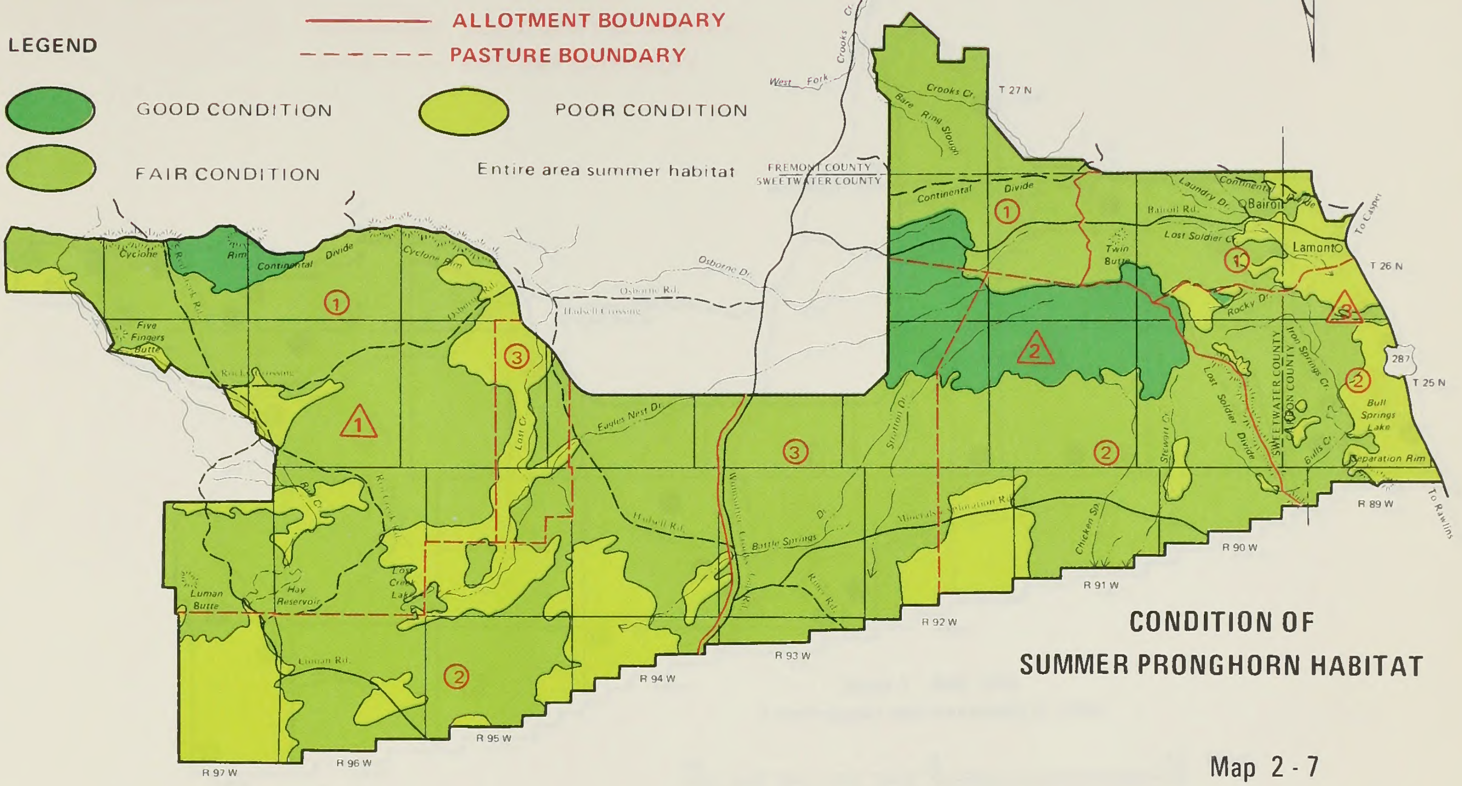
PASTURES
① CYCLONE
130,215 acres
② LUMAN
109,794 acres
③ LOST CREEK
15,508 acres

⚠2 **STEWART CREEK ALLOTMENT**
189,494 Acres

PASTURES
① SAND SPRING
40,124 acres
② CHICKEN SPRING
86,794 acres
③ OSBORNE WELL
62, 576 acres

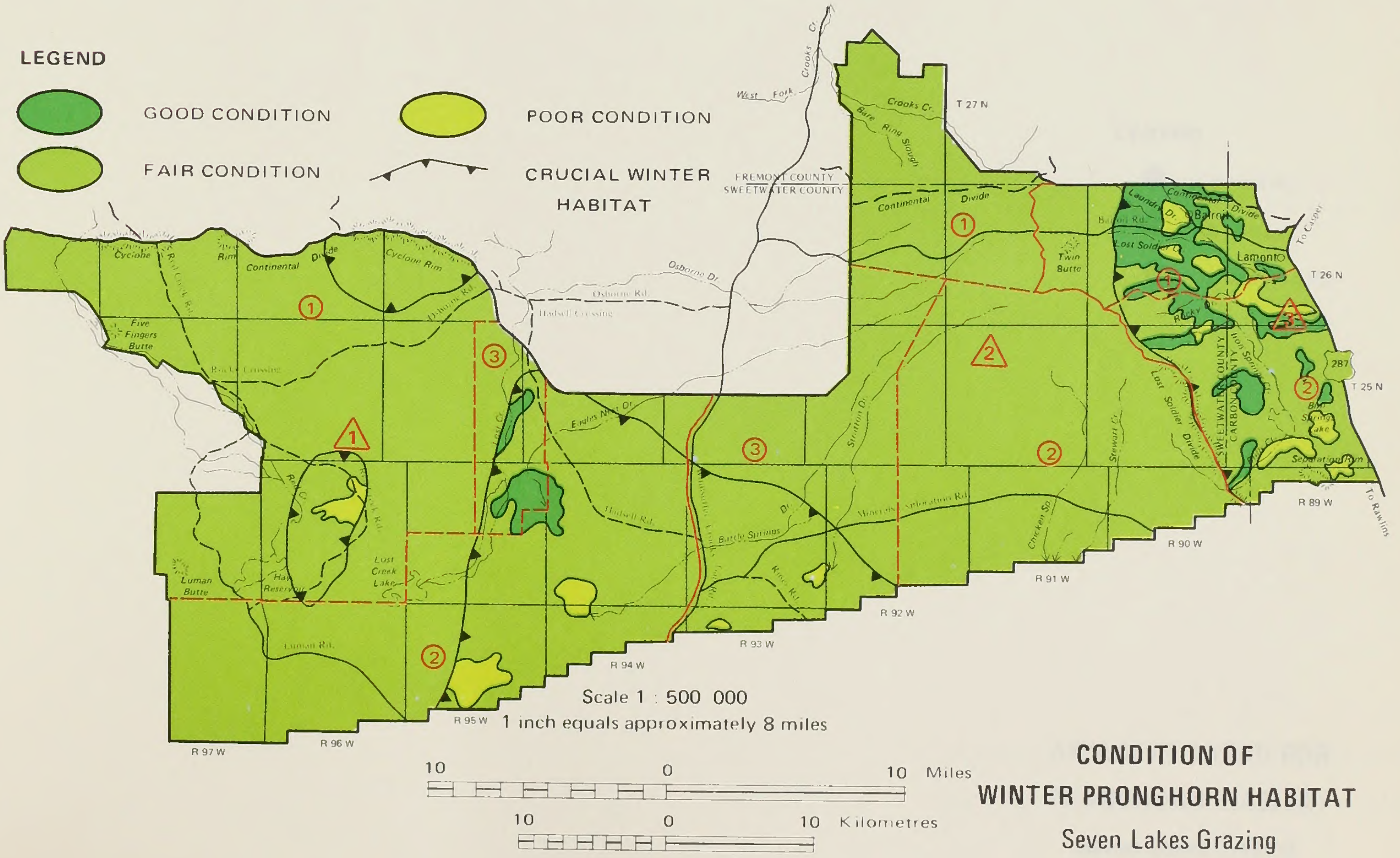
⚠3 **FERRIS ALLOTMENT**
68,375 Acres

PASTURES
① LOST SOLDIER
29,530 acres
② BULL SPRINGS
38,845 acres



CONDITION OF SUMMER PRONGHORN HABITAT

Map 2-7

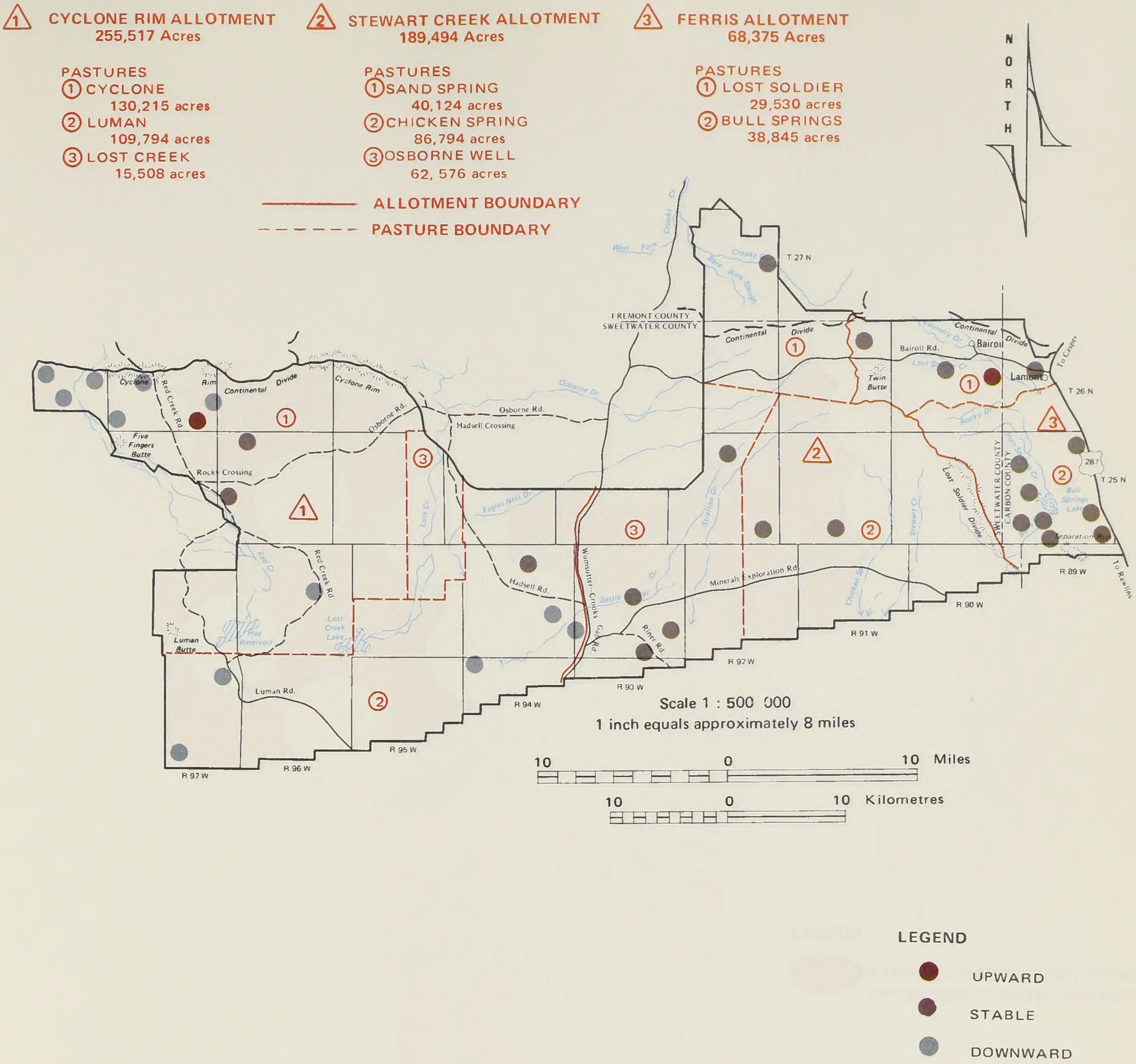


CONDITION OF WINTER PRONGHORN HABITAT

Seven Lakes Grazing

Environmental Statement

Map 2-8

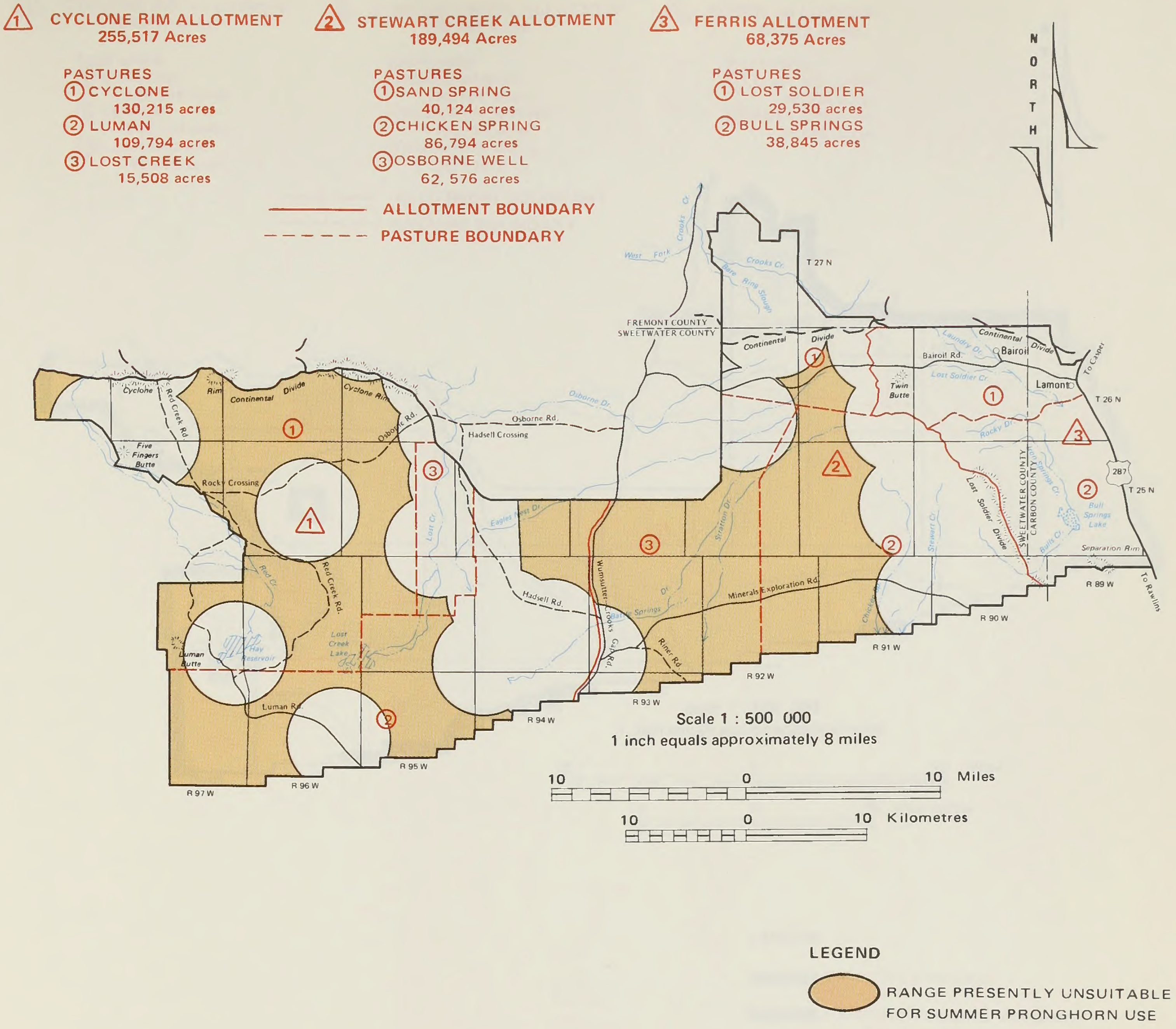


APPARENT TREND FOR PRONGHORN HABITAT

Seven Lakes Grazing

Environmental Statement

Map 2 - 9



RANGE UNSUITABLE AS PRONGHORN HABITAT BECAUSE OF LACK OF WATER

Seven Lakes Grazing

Environmental Statement

Map 2 - 10

⚠1 CYCLONE RIM ALLOTMENT
255,517 Acres

PASTURES
① CYCLONE
130,215 acres
② LUMAN
109,794 acres
③ LOST CREEK
15,508 acres

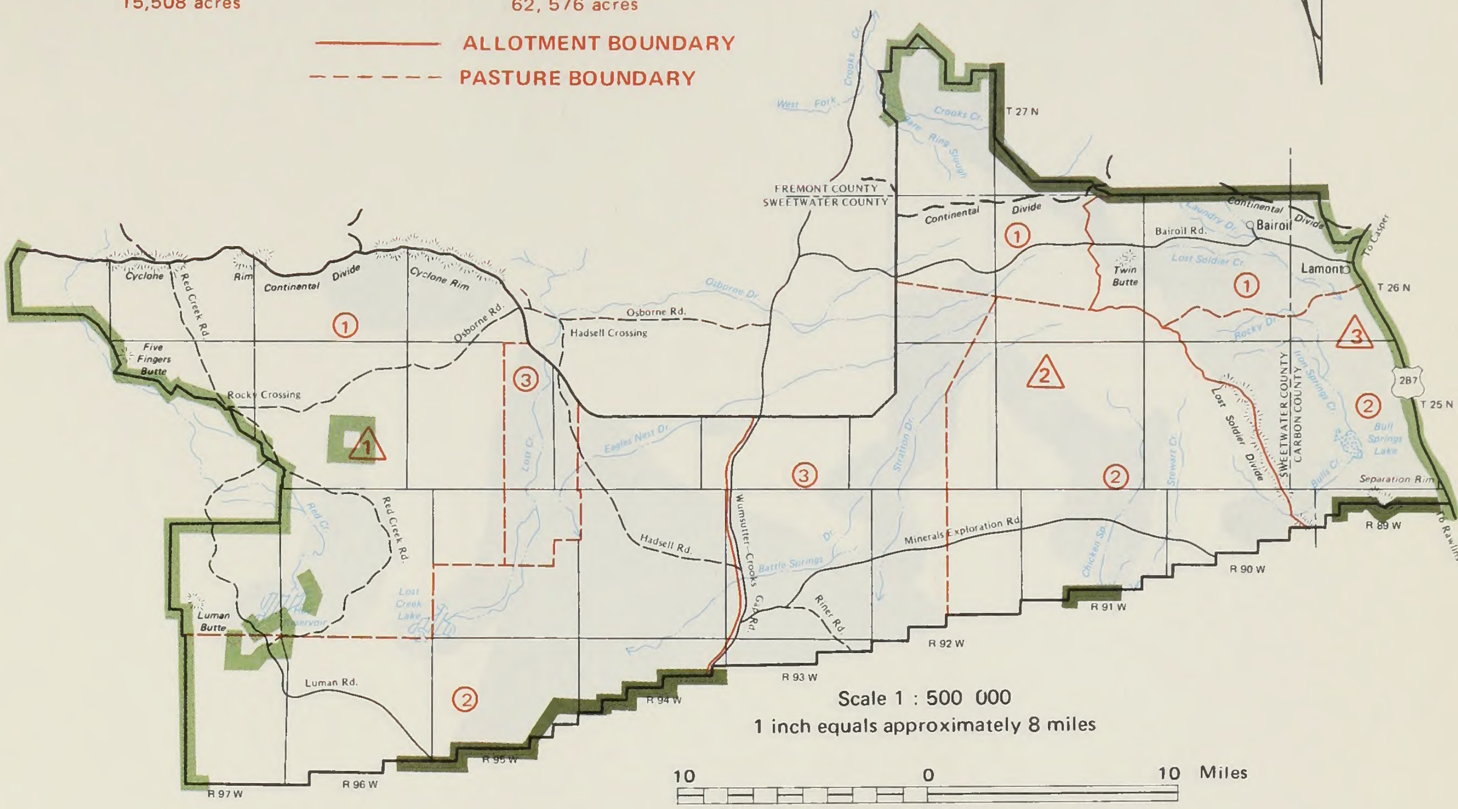
⚠2 STEWART CREEK ALLOTMENT
189,494 Acres

PASTURES
① SAND SPRING
40,124 acres
② CHICKEN SPRING
86,794 acres
③ OSBORNE WELL
62, 576 acres

⚠3 FERRIS ALLOTMENT
68,375 Acres

PASTURES
① LOST SOLDIER
29,530 acres
② BULL SPRINGS
38,845 acres

——— ALLOTMENT BOUNDARY
– – – – PASTURE BOUNDARY



Scale 1 : 500 000
1 inch equals approximately 8 miles

10 0 10 Miles

10 0 10 Kilometres

LEGEND

🟩 EXISTING FENCING

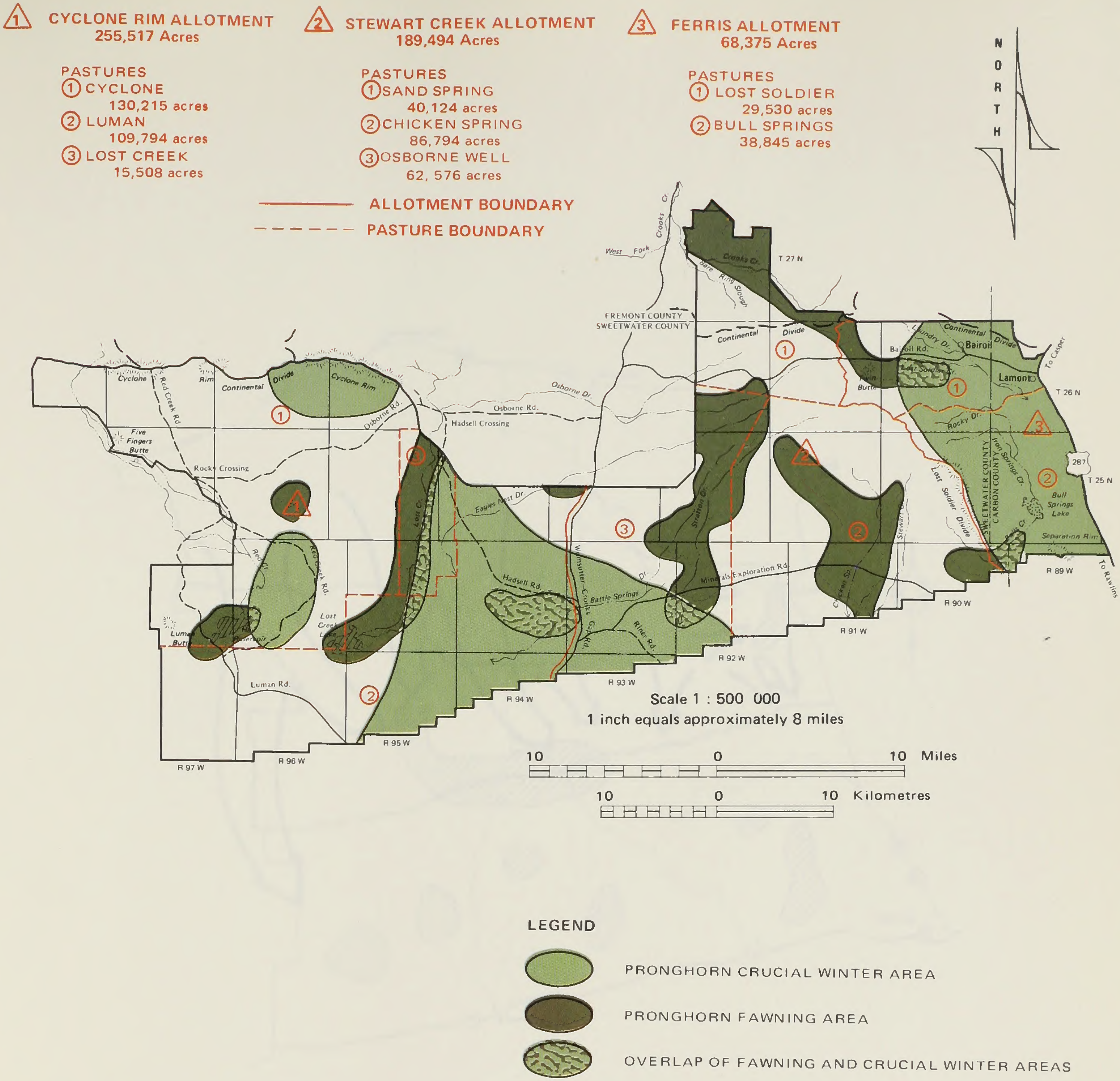
▬ EXISTING FENCING NEEDING MODIFICATION

EXISTING FENCING

Seven Lakes Grazing

Environmental Statement

Map 2 - 11

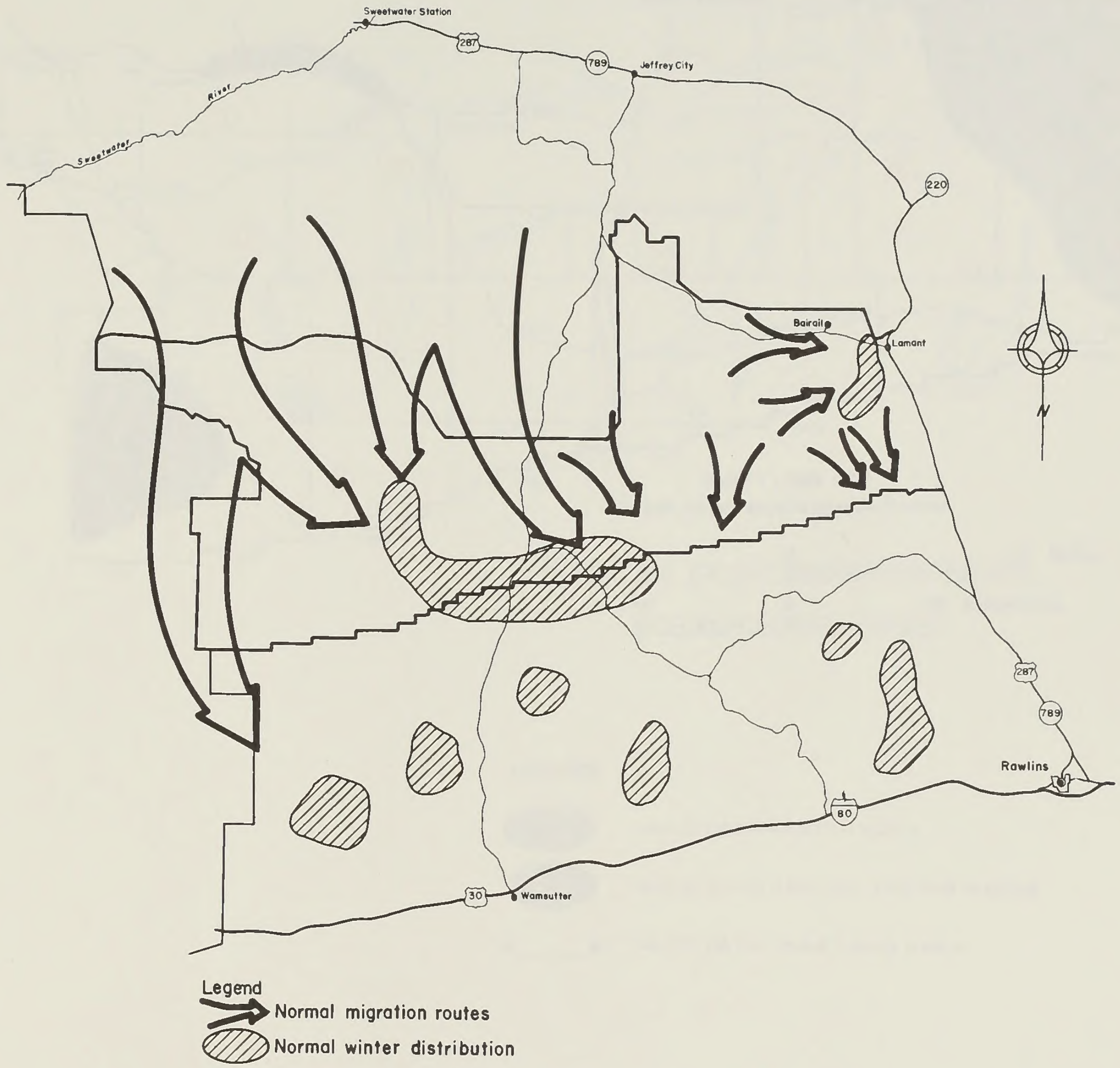


PRONGHORN FAWNING AND CRUCIAL WINTER AREAS

Seven Lakes Grazing

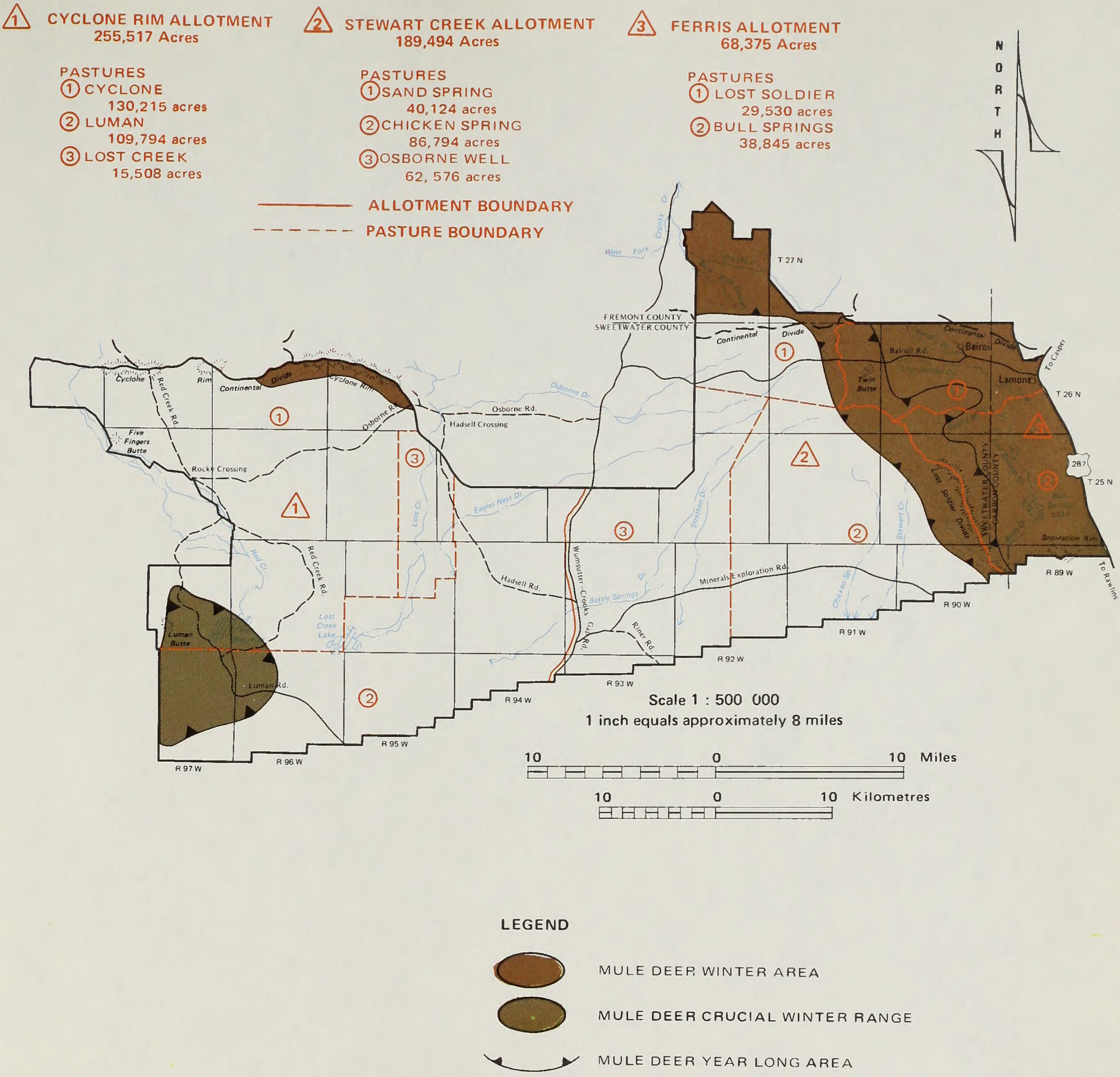
Environmental Statement

Map 2 - 12



NORMAL MIGRATION ROUTES AND NORMAL WINTER DISTRIBUTION OF PRONGHORN

Seven Lakes Grazing
Environmental Statement
Map 2 - 13



MULE DEER HABITAT

Seven Lakes Grazing

Environmental Statement

Map 2 - 14

TABLE 2-25
PRESENT ESTIMATES AND FUTURE OBJECTIVES*

Mule Deer	Yearlong Present	Yearlong Future
Ferris	25**	25
Stewart Creek	75	75
Cyclone Rim	75	75
TOTALS	175	175

*Wyoming Game and Fish Department 1980 management objectives as developed by Wyoming Game and Fish biologists.

**Numbers of mule deer.

within the ES area. These areas, 96, 98, and 99, (Figure 2-2) are the management units by which the Department determines and controls mule deer populations through hunter harvest.

Food and Cover. The area offers limited or marginal habitat for deer since mule deer prefer areas of adequate forest or brush cover with uneven topography. Often, the distribution of cover may be more important in determining the distribution of mule deer than the vegetative type used for feeding (Hanson 1976). Because of this, mule deer in the ES area are restricted to the areas mentioned earlier and in a few scattered draws where sagebrush cover is rather dense and meadows are nearby.

Approximately 129,000 acres of suitable crucial winter and yearlong habitat are available for mule deer use. These acres (Table 2-26), or 25% of the ES area is winter range, with about 24,719 acres in the Luman and Cyclone pastures considered crucial winter range for about 75 mule deer. The conditions of these areas are presented in Table 2-27.

Food preferences of mule deer vary considerably by season. Winter diets characteristically contain 74% shrubs and trees, 15% forbs, and 11% grasses, while summer diets may contain 49% shrubs, 46% forbs, and 3% grasses (Kufeld et al. 1973). In Montana, Mackie (1970) found that big sagebrush was the primary winter forage of deer on all types combined. Rubber rabbitbrush was the second most important food in the winter period, while forbs had little importance and grass use was minor. Food habit studies have not been conducted in the ES area to determine if the mule deer forage use is similar for this area.

Water. In the Seven Lakes ES area, deer populations are limited by intermittent water sources or the sparce distributions of water throughout the area.

Distributions and Migrations. The ES area mule deer are largely confined to those areas shown in Map 2-14. The distribution of deer on the winter ranges is largely dependent on topography, microclimate, and vegetation. Deer are usually found on south-facing slopes where wind speed is slow, temperatures are more moderate, vegetation is exposed and available, and sunlight is more direct (Wyoming Game and Fish Department).

Mule deer migrations are minor in this area. Deer are known to move to Green Mountain in the summer, and return to the lower areas during the winter. Some movements may occur along Lost Soldier Divide. The deer in the Luman Ranch area are believed to be sedentary.

Sage Grouse

Populations. Sage grouse *(Centrocercus urophasianus)* is the most abundant game bird in the ES area. Although intensive population inventories are lacking, counts of male birds on some identified strutting grounds have indicated an estimated population from 850 to 1,200 birds. In 1969, the sage grouse populations in the Red Desert were indicated as stable with only normal population fluctuations (June 1969a). Habitat loss from ongoing energy development and exploration is occurring, which may offset population levels.

Food and Cover. Studies on sage grouse have consistently shown that these birds are greatly dependent on sagebrush for both food and cover during much of the year. Patterson (1952) concluded that the sage grouse in southwest Wyoming are solely dependent on sagebrush for food and cover during the winter, and rely on it for the bulk of their diet during the other seasons. Studies in the Montana sagebrush communities by Wallstad and Schladweiler (1974), and Wallstad and Pyrah (1974), indicated the importance of sagebrush for winter cover, strutting ground cover, nesting cover, and brooding cover.

Patterson (1952) found an adult sage grouse's year round diet is comprised of 96% plant material and the remainder insects. Juvenile grouse diets may contain 75% insects early in the summer, dropping to less than 10% by fall. Sagebrush ranges from 99.7% of the diet of adult sage grouse during the winter, to 44.9% in the summer.

The cover requirements for sage grouse vary between the seasons. During the winter, dense stands of exposed sagebrush offer the best cover (Johnsgard 1973). However, during the strutting season, open areas with little sagebrush are used by displaying males on the strutting grounds. The common locations are open knolls and ridges in sagebrush, open spots on level land, and alkali flats (Edminster 1954). Nesting cover is predominantly sagebrush. Patterson (1952) found that 92% of the nesting hens located their nests under sagebrush. Eighty-two percent of all nests observed were under sagebrush 10 inches to 20 inches tall; the average height was 14 inches. During the brooding of young, open stands of sagebrush and meadow area, rich in insects, are used by females and young. Adults also consume a large percentage of forbs and require grassy habitats at this time (Patterson 1952).

The ES area provides 65,443 acres of crucial habitat for sage grouse (Table 2-28). The identified strutting-nesting grounds are classified (Appendix B-2-8) as 4,058 acres in good condition; 39,172 acres in fair; and 8,881 acres in poor condition. The crucial wintering areas are classified as 2,142 acres good; 10,180 acres fair; and 1,000 acres poor. The draws and ravines which offer the optimum roosting and loafing cover (Patterson 1952) are classified as 23,240 acres good; 12,207 acres fair; and 4,817 acres poor for the entire ES area (Table 2-29). Table 2-30 presents the condition of sage grouse habitat. In general, the area provides both good food and cover for all phases of the sage grouse life cycle. Some meadows are deteriorated from heavy livestock use, and may be limiting sage grouse production in isolated areas.

Water. Studies on sage grouse in southwest Wyoming and other western states have indicated that sage grouse are closely associated with wetland areas and water developments during the summer and early fall seasons. Patterson (1952) stated that seasonal movements are primarily a result of the wide variations in the nature, amount, and distribution of water, and the availability of sagebrush for food and cover. During the summer months, sage grouse are normally limited to the immediate vicinities of stream courses, isolated desert springs, and water holes. Edminster (1954) noted that although

TABLE 2-26
MULE DEER HABITAT BY PASTURE

	Crucial Winter		Yearlong*	
Ferris Allotment	acres	percent**	acres	percent*
Bull Springs	0	0	38,845	100
Lost Soldier	0	0	29,500	100
Allotment			68,345	100
Stewart Creek				
Chicken Springs	0	0	11,988	14
Sand Springs	0	0	21,710	55
Osborne Well	0	0	0	0
Allotment			33,698	18
Cyclone Rim				
Luman	16,115	15	0	0
Cyclone	8,604	7	2,120	2
Lost Creek	0	0	0	0
Allotment	24,719	10	2,120	1
ES Area	24,719	5	104,163	10

*Includes winter habitat on Map 2-14.
**The percent of the pasture or allotment acreage.

TABLE 2-27
MULE DEER HABITAT VEGETATION CONDITION

	Mule Deer Crucial Winter						Mule Deer Winter-Yearlong					
	Good		Fair		Poor		Good		Fair		Poor	
	Acres	%*	Acres	%*	Acres	%*	Acres	%*	Acres	%*	Acres	%*
Ferris Allotment												
Bull Springs							4,412**	11.7	28,230	75.0	4,988	13.8
Lost Soldier							11,821	41.2	14,943	52.1	1,098	6.7
TOTAL							16,233	24.5	43,173	65.1	6,086	10.4
Stewart Creek												
Chicken Springs							7,307	61.0	4,641	38.7	40	0.3
Sand Springs							15,529	71.5	6,181	28.5	0	0
Osborne Well							0	0	0	0	0	0
TOTAL							22,836	67.8	10,822	32.1	40	0.1
Cyclone Rim												
Cyclone	1,250	14.5	6,530	75.9	824	9.6	0	0	2,120	100	0	0
Lost Creek	0	0	0	0	0	0	0	0	0	0	0	0
Luman	1,300	8.1	9,941	61.7	4,874	30.2	0	0	0	0	0	0
TOTAL	2,550	10.3	16,471	66.6	5,698	23.1	0	0	2,120	100	0	0
ES TOTAL	2,550	10.3	16,471	66.6	5,698	23.1	39,069	38.3	56,115	54.9	6,126	6.8

*Percent of habitat in that condition class.
**Does not include 2,853 acres of dry lake waste in the Ferris allotment.

Condition classes as determined by methodology in Appendix B-2-8.

Good - A vegetative type where te plant community provides mule deer with the best possible plant conditions and components to meet their habitat needs.

Fair - A vegetative type where the plant community provides mule deer with the majority of habitat needs but not at the optimum.

Poor - A vegetative type where the plant community does not provide mule deer with a majority of their habitat needs or the community lacks an important component to support mule deer.

TABLE 2-28
SAGE GROUSE HABITAT BY PASTURE AND ALLOTMENT

Allotment and Pasture	Strutting-Nesting Acres	Strutting-Nesting %*	Crucial Winter Acres	Crucial Winter %*
Ferris				
Bull Springs	6,572	16.9	0	0
Lost Soldier	0	0	0	0
TOTAL	6,572	9.6	0	0
Stewart Creek				
Osborne Well	8,042	12.8	0	0
Chicken Springs	14,913	17.2	6,842	7.8
Sand Spring	0	0	0	0
TOTAL	22,955	12.1	6,842	3.6
Cyclone Rim				
Luman	6,226	5.6	1,528	1.4
Lost Creek	920	5.9	2,552	16.4
Cyclone	15,438	11.8	2,400	1.8
TOTAL	22,584	8.9	6,480	2.5
ES TOTAL	52,111	10.1	13,332	2.6

*The percent of allotment and pasture.

TABLE 2-29
CONDITION OF DRAW VEGETATION FOR SAGE GROUSE IN THE ES AREA

	Acres	Percent
Good	23,240	58%
Fair	12,207	30%
Poor	4,817	12%
Total	40,264	100%

Habitat condition classes as determined by methodology in Appendix B-2-8.

Good - A vegetative type where the plant community provides sage grouse with the best possible plant conditions and components to meet their habitat needs.

Fair - A vegetative type where the plant community provides sage grouse with the majority of habitat needs but not at the optimum.

Poor - A vegetative type where the plant community does not provide sage grouse with a majority of their habitat needs or the community lacks an important component to support sage grouse.

TABLE 2-30
SAGE GROUSE HABITAT VEGETATION CONDITION

	Nesting and Strutting						Crucial Winter					
	Good		Fair		Poor		Good		Fair		Poor	
	Acres	%Habitat	Acres	%Habitat	Acres	%Habitat	Acres	%Habitat	Acres	%Habitat	Acres	%Habitat
Ferris Allotment												
Bull Springs	198	3	4,110	63	2,264	34						
TOTAL	198	3	4,110	63	2,264	34						
Stewart Creek Allotment												
Osborne Well			8,042	100								
Chicken Spring	3,860	26	11,053	74								
Sand Spring							2,142	31.3	4,700	68.7		
TOTAL	3,860	17	19,095	83			2,142	31.3	4,700	68.7		
Cyclone Rim Allotment												
Luman			4,946	79	1,280	21	0	0	1,528	100	0	0
Lost Creek			640	70	280	30	0	0	2,552	100	0	0
Cyclone			10,381	67	5,057	33	0	0	1,400	58.3	1,000	41.7
TOTAL			15,967	71	6,617	29	0	0	5,480	84.6	1,000	15.4
ES Total	4,058	8	39,172	75	8,881	17	2,142	16.1	10,180	76.4	1,000	7.5

Habitat condition class was determined by methodology in Appendix B-2-8.

Good - A vegetative type where the plant community provides sage grouse with the best possible plant condition and components to meet their habitat needs.

Fair - A vegetative type where the plant community provides sage grouse with the majority of habitat needs but not at the optimum.

Poor - A vegetative type where the plant community does not provide sage grouse with a majority of their habitat needs or the community lacks an important component to support sage grouse.

water was not an absolute requirement for brood survival, it was essential for superior brooding areas.

In the Seven Lakes ES area, much of the area has adequate water for sage grouse. However, there are some 200,000 acres lacking water which might be used by sage grouse later in the summer if water was available. These areas (Map 2-10) are essentially the same as those identified as lacking water for pronghorn.

Distributions and Migrations. Sage grouse are social animals, forming large flocks during several periods of the year. Strutting grounds are the central habitat. These areas (Map 2-15), varying in size from several hundred feet to several acres (Edminster 1954), are places where male sage grouse gather in late winter and early spring to collectively display to and court females. They are also the general vicinities where females tend to nest. Wallstad and Pyrah (1974) found in Montana that 68% of the hens nested within 1.5 miles of the strutting grounds. Thus, the strutting grounds are not only used for courtship, but are the center of nesting activity. There are three known strutting grounds in the proposed Cyclone Rim allotment, five in the proposed Stewart Creek allotment, and one in the Ferris incommon allotment (Map 2-15).

Brooding habitat and requirements differ greatly from other seasonal requirements. Studies conducted by Klebenow and Gray (1967), Peterson (1970), and Patterson (1952) showed that grasses and forbs are heavily used by both adults and young during the spring and summer. Meadows are necessary for brooding habitat as indicated by Patterson (1952):

"The reduction and elimination of perennial grasses and forbs will impose serious restrictions upon the normal feeding habitats of females and young birds, particularly during the early stages of development. At this time, they are highly dependent on insect life. In order to obtain this type of food, broods customarily disperse from the individual nest site and concentrate in the vicinity of native grasses and sedge meadows." The meadows are also used later in the summer when all the birds move from the dry upper range types to the lower mesic bottomlands to feed on succulent vegetation (Peterson 1970).

Sage grouse are known to concentrate along Crooks Creek, Stewart Creek, Lost Soldier Creek, Lost Creek, and those springs and reservoirs which support meadow-type vegetation. Many of these areas are also cattle concentration centers, which are in a somewhat poor condition for sage grouse use due to over utilization by livestock.

In Montana, Eng and Schladweiler (1972) found that sage grouse are closely associated with dense stands of sagebrush from early September to early April. They also noted that the birds concentrate more on winter ranges during winter than they concentrate at other times of the year. In the Seven Lakes ES area, winter flocks may range up to several hundred birds. Known winter concentration (Table 2-30) areas are found in the proposed Cyclone Rim and Stewart Creek allotments (Map 2-15). These areas are expected to shift depending on vegetative cover, snow accumulation, and weather conditions.

Waterfowl

Populations. The ES area lies on the eastern boundary of the Pacific Flyway, and is available for waterfowl use during the spring, summer, and fall seasons. Little information exists on either the migrating or nesting populations of waterfowl in the area. However, there are population estimates based on the amount of surface acreage of ponds and miles of live streams. Using the estimates of one pair of ducks for each surface acre of pond, and twelve pairs of ducks per mile of live stream (Wyoming Game and Fish Department), a total of 40 nesting pairs of ducks may occur in the ES area. Use may increase during the migration period.

Observed species include mallards, pintails, gadwalls, wigeon, green-winged teal, and blue-winged teal.

Food and Cover. Waterfowl are largely confined to reservoirs, streams, dugouts, and other impounded water sources. Use of these waters is limited to periods from the spring thaw and runoff, to the early winter freezing dates. Surface acreage, shoreline vegetation, emergent vegetation, nutrients, and waterflows are important criteria for habitat selection by waterfowl (Berg 1956, Lokemoen 1973). There are few good waterfowl habitats in the ES area due to an overall lack of water and poor shoreline vegetation due to heavy livestock use around these areas.

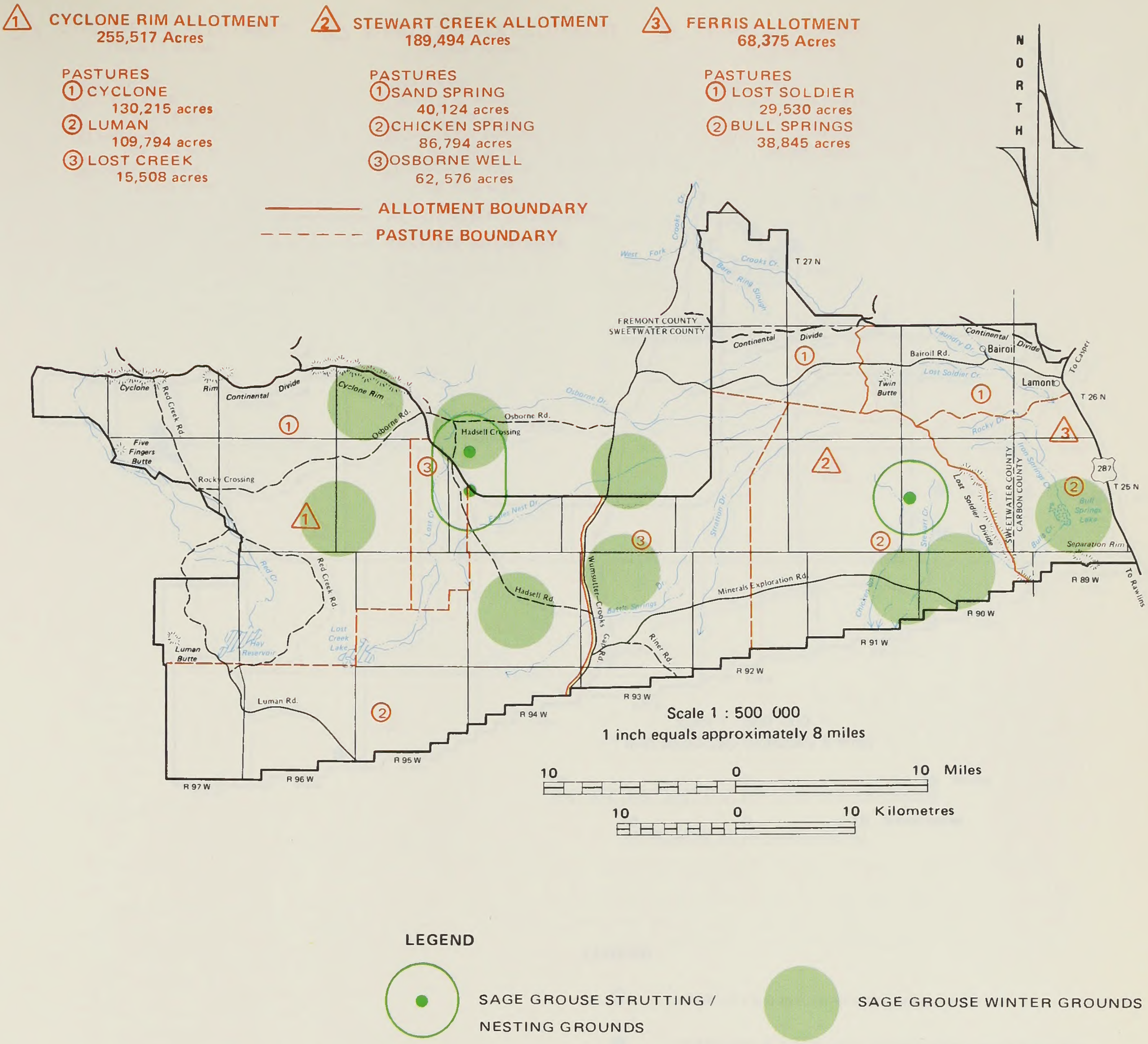
Suitable waters may be unused due to a lack of cover for nesting and brood rearing activities. Most ducks occuring in the ES area are dabblers which prefer dry, upland cover types for nesting. Sowls (1955) found that ungrazed meadows accomodated 87% of the nests found. He also found that mallards, pintails, and gadwall were more apt to nest at greater distances from water. These species were observed to be most prevalent in the ES area. Cover adjacent to most reservoirs and lakes is extremely poor due to livestock grazing. Thus, poor nesting habitat or subsequent nest predation may be a limiting factor of waterfowl production in the area.

Distributions. Although most impounded waters have some potential for waterfowl use, actual use has been observed on ten waters in the ES area shown on Map 2-16. Other waters may receive use during the spring, early summer, or during migration periods depending on water levels and vegetation.

Nongame Wildlife

Nongame wildlife are those species for which there is no hunting season or allowed harvest. Such species include numerous birds, mammals, reptiles, amphibians, and invertebrates. These animals make up a large portion of the fauna in the Seven Lakes ES area and are important in the functioning of the ecosystem.

Studies on nongame species are very limited in the ES area. However, inventories conducted during 1975 and 1976 located numerous raptor nesting areas and prairie dog towns. Also, the occurrence of many nongame species was recorded. A total of 11 species of nongame mammals and 23 species of nongame birds were observed in the ES area (Appendix B-2-11).

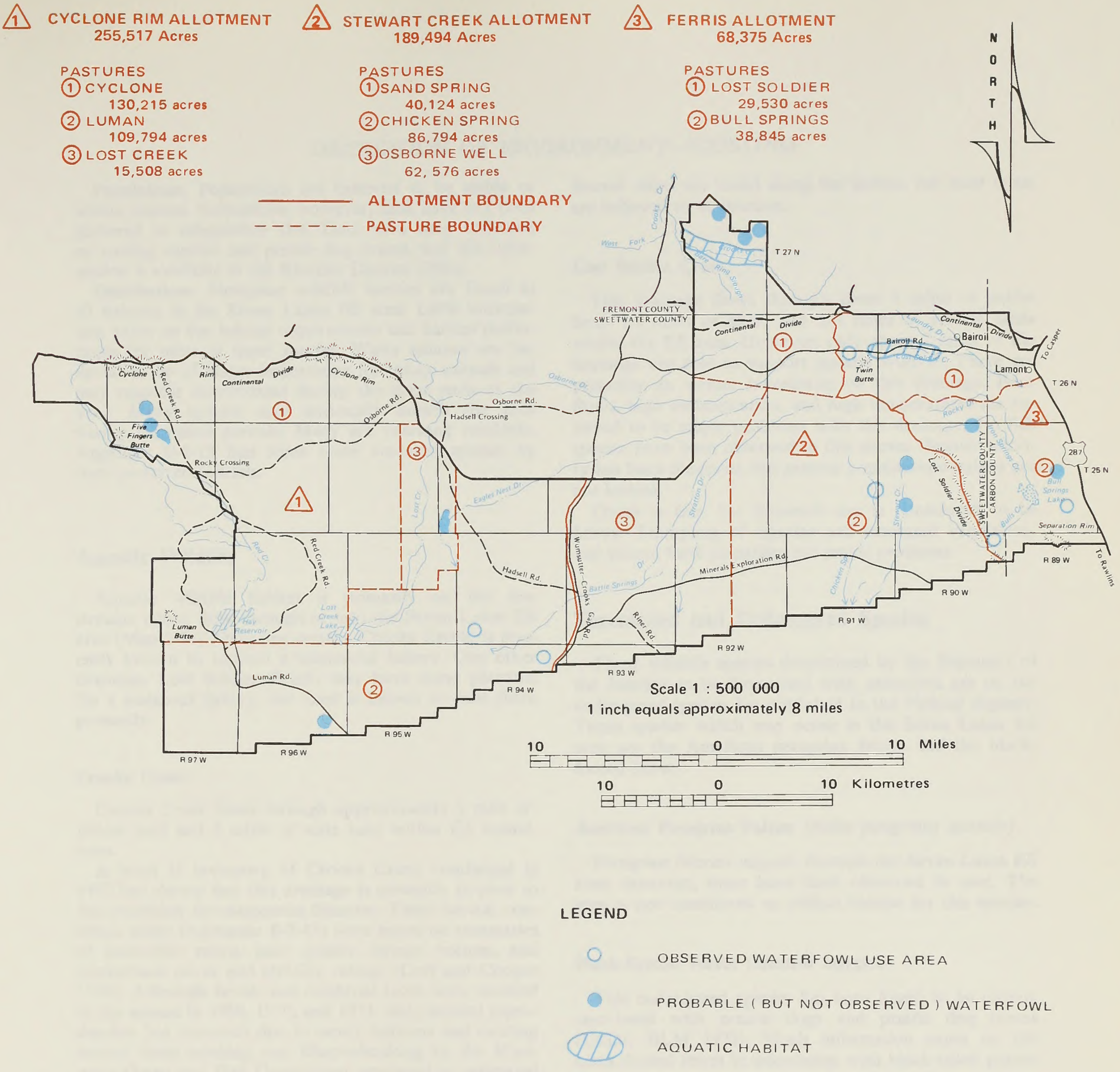


SAGE GROUSE STRUTTING / NESTING AND WINTER GROUNDS

Seven Lakes Grazing

Environmental Statement

Map 2 - 15



△1 CYCLONE RIM ALLOTMENT
255,517 Acres

PASTURES
① CYCLONE
130,215 acres
② LUMAN
109,794 acres
③ LOST CREEK
15,508 acres

△2 STEWART CREEK ALLOTMENT
189,494 Acres

PASTURES
① SAND SPRING
40,124 acres
② CHICKEN SPRING
86,794 acres
③ OSBORNE WELL
62, 576 acres

△3 FERRIS ALLOTMENT
68,375 Acres

PASTURES
① LOST SOLDIER
29,530 acres
② BULL SPRINGS
38,845 acres

——— ALLOTMENT BOUNDARY

- - - - - - PASTURE BOUNDARY

Scale 1 : 500 000
1 inch equals approximately 8 miles

LEGEND

○ OBSERVED WATERFOWL USE AREA

● PROBABLE (BUT NOT OBSERVED) WATERFOWL

▨ AQUATIC HABITAT

AQUATIC HABITAT AND WATERFOWL USE AREAS

Seven Lakes Grazing

Environmental Statement

Map 2 - 16

Populations. Populations are believed to be stable or within normal fluctuations; however, data have not been gathered to substantiate this. Data have been collected on nesting raptors and prairie dog towns, and this information is available at the Rawlins District Office.

Distributions. Nongame wildlife species are found in all habitats in the Seven Lakes ES area. Little information exists on the habitat requirements and habitat preferences for most of these species. Water sources are believed to be of major importance for many animals and may regulate distributions during the drier parts of the year. Many species may seasonally inhabit the area during migration periods. Many are yearlong residents. Appendix B-2-12 lists some more common species by their preferred habitats.

Aquatic Wildlife

Aquatic wildlife habitat is primarily on the few streams which flow through or into the Seven Lakes ES area (Map 2-16). Only one stream, Crooks Creek, is presently known to support a salmonoid fishery. One other drainage, Lost Soldier Creek, may have some potential for a sustained fishery, but none is known to exist there presently.

Crooks Creek

Crooks Creek flows through approximately ½ mile of public land and 5 miles of state land within ES boundaries.

A level II inventory of Crooks Creek conducted in 1975 has shown that this drainage is presently in poor to fair condition for salmonoid fisheries. These habitat condition ratios (Appendix B-2-13) were based on summaries of pool-riffle ratios, pool quality, stream bottom, and streambank cover and stability ratings (Duff and Cooper 1976). Although brook and cutthroat trout were stocked in the stream in 1969, 1970, and 1973, little natural reproduction has occurred due to sandy bottoms and existing beaver dams washing out. Electoshocking by the Wyoming Game and Fish Department produced an estimated 106 brook trout per mile (personal communication Chuck Viox), which indicates poor fishery production. Overall, the drainage has poor cover, high temperatures, inadequate flows, high turbidities, and poor spawning habitat. Prior to their introduction by the Wyoming Game and Fish Department, no trout were found in Crooks Creek. Livestock use is light to moderate over most of the drainage, with heavy use around Sand Spring. Streambank damage itself is moderate to heavy due not only to excessive numbers of cattle, but also to the sandy loam bank materials.

Recent exploration and development of uranium ore on Green Mountain is increasing sediment yields into the drainage. Such development is reducing the Crooks Creek salmonoid fishery.

Brook trout have been observed in the confluence of Sand Spring and are known to exist along the drainage. Beaver dams are found along the stream, but most dams are believed to be inactive.

Lost Soldier Creek

This drainage flows through about 4 miles of public land, 1.5 miles of state, and 3/4 miles of private lands within the ES area. However, only about 2 miles of the drainage are able to support aquatic wildlife. There are presently no stream inventories on this drainage. Poor flows, high sedimentation, and high temperatures are believed to be major problems with this drainage. No fish species have been observed in this stream. Beaver activity has been observed, but present population numbers are not known.

Cover is fair, but livestock use is considered to be heavy. Trampling of riparian and emergent vegetation, and stream bank sloughing are major problems.

Threatened and Endangered Species

Those wildlife species determined by the Secretary of the Interior to be threatened with extinction are on the endangered species list published in the *Federal Register*. Those species which may occur in the Seven Lakes ES area are the American peregrine falcon and the black-footed ferret.

American Peregrine Falcon *(Falco peregrinus anatum)*

Peregrine falcons migrate through the Seven Lakes ES area; however, none have been observed to nest. The area is not considered as critical habitat for this species.

Black-Footed Ferret *(Mustela nigripes)*

This endangered species has been found to be closely associated with prairie dogs and prairie dog towns (USDI, BLM 1972). Much information exists on the black-footed ferret in association with black-tailed prairie dogs *(Cynomys* ludoxicianus), but little information has been written on its relationship with white-tailed prairie dogs *(Cynomys leucurus*). Since it is the latter species which occurs in the ES area, information on the black-footed ferret in the area is lacking. Clark (1975) published known sightings of black-footed ferrets in Wyoming. No sightings have been reported in the ES area. There have been several sightings of black-footed ferrets in the Oregon Buttes area, approximately 20 miles west of the ES boundary. Since the habitat at Oregon Buttes is similar to that in the ES area, and there are white-tailed prairie dog concentrations between the two areas, it seems highly probable that ferrets could occur in the Seven Lakes ES area. Approximately 30 hours were spent at night in towns containing large numbers of prairie dogs, looking for black-footed ferret presence during September. No evidence of ferrets was observed.

State of Wyoming Rare and Endangered Wildlife

The State of Wyoming Game and Fish Department has published a list of wildlife species which are thought to be endangered, rare, status undetermined, extinct, or peripheral in Wyoming. The species and their status which may occur in the Seven Lakes ES area are listed in Table 2-31.

Wild Horses

Population

The Seven Lakes ES area is known to have supported wild horses since the early 1900s. Most of the horses are believed to be descendants of horses that escaped or were released on the range by local ranchers. Today there are an estimated 240 wild and free-roaming horses in the area. Their numbers are increasing about 20% annually. (No wild burros are found in the Seven Lakes ES area.) Table 2-32 displays the wild horse inventory information for the Seven Lakes Planning Unit. Additional information on inventories, characteristics, and history of wild horses in the Seven Lakes Planning Unit is found in the Seven Lakes Unit Resource Analysis (URA) which is available for public inspection in the Rawlins District Office.

Distribution and Movement

Wild horses can be found throughout the Seven Lakes ES area. Movement within the general distribution areas appears to normally be confined to a 3 or 4 square mile area in which animals forage and water.

The horses are found in three concentration areas (Map 2-17). There are approximately 80 horses in seven bands consistently located along the checkerboard boundary north of the Chain Lakes. About 40 horses are usually found on the south facing slopes of Cyclone Rim northwest of Stratton Lake. And finally, about 120 wild horses are located along the Crooks Gap-Bairoil Road in approximately twelve bands. These last horses seem to be the most mobile. Some of these horses occasionally wander into the northern half of the Ferris allotment.

The horses also move between areas of concentration. Apparently wild horses from the Seven Lakes commonly move north onto Green Mountain (outside the ES area) during the summer, mixing with wild horses from the Lander Resource Area. Wild horses also summer on Stratton Rim. The ES area boundary runs through the concentration areas near Crooks Mountain and on Cyclone Rim. Sometimes the wild horses in these areas are found in the Seven Lakes Planning Unit and sometimes they are found in the Lander Resource Area (Map 2-17).

Horse movement also occurs, back and forth, across the western boundary of the ES area (Rock Springs-Rawlins District boundary). There is a large concentration of wild horses in the Continental Peak herd which is found just west of the west boundary fence, and these horses probably mix with those of the ES area.

Additionally, wild horses from the Seven Lakes Unit are known to occasionally migrate down onto the checkerboard lands to the south. The horses have free access in several places to these checkerboard lands and go there for water. This fact somewhat complicates managment of wild horses in the ES area.

In winter, the horses are often found on exposed ridges which are blown free of snow. The bands prefer to feed along draws, ravines, and protected areas such as north or east facing slopes and small basins.

Crucial habitat can be defined as that habitat required for the survival of an animal population. No crucial habitat for wild horses has been identified in the Seven Lakes ES area, because no particular areas are believed to be required for their survival. The horses do frequent certain areas, but the horses would leave these areas if sufficiently disturbed or if they lack feed. Horses are able to forage in deeper snows than most other animals and are capable of traveling through fairly deep snow to areas where forage would be more readily available.

The areas of horse use are somewhat dependent on water supplies, although it is not uncommon to see wild horses more than 5 miles from water. In late summer, when water supplies are limited, herd ranges become restricted. Water sites used by the bands include, the Chain Lakes, Sooner Reservoir, Chicken Spring, Dry Well Reservoir, Free Flowing Well, Osborne Well, and the stock reservoir at Stratton Lakes. In addition to the above mentioned sites, the horses use water from potholes in roads after rainstorms. Most movement to and from water is in the early mornings and late evenings.

Habitat

A draft wild horse management plan (Herd Management Area Plan—HMAP) was written in June of 1977. It would be implemented concurrently with the proposed action.

Forage has not been reserved for wild horses in the Seven Lakes ES area. Each horse is estimated to consume an average of 900 pounds of forage per month (Rice 1975). The 240 wild horses presently in the Seven Lakes ES area consume approximately 2,592,000 pounds of forage annually. Using Hansen's (1975) data, 900 pounds of forage for wild horses is equivalent to .574 of a winter sheep AUM (900 pounds x .287 wild horse sheep diet similarity: 450 pounds of forage per winter sheep AUM). It is estimated that on the average a wild horse requires 10 gallons of water per day.

The condition of the wild horse population appears to be excellent. It is very rare to encounter an injured, sick, or emaciated wild horse. There are no apparent inbreeding problems.

The wild and free-roaming horses have been protected from unauthorized capture, harassment, and killing by federal law since 1971.

Because of the unfenced open spaces presently found in the Seven Lakes ES area, the wild horses are indeed free-roaming. They use public, state, and private lands in

TABLE 2-31
STATE OF WYOMING RARE AND ENDANGERED WILDLIFE OBSERVED IN THE SEVEN LAKES ES AREA

Species	Status	
Burrowing Owl	Rare	A ground dwelling owl closely associated with prairie dog towns. It has been observed and photographed in the area.
Meadow Jumping Mouse	Rare	Possibly inhabiting low meadows near streams.

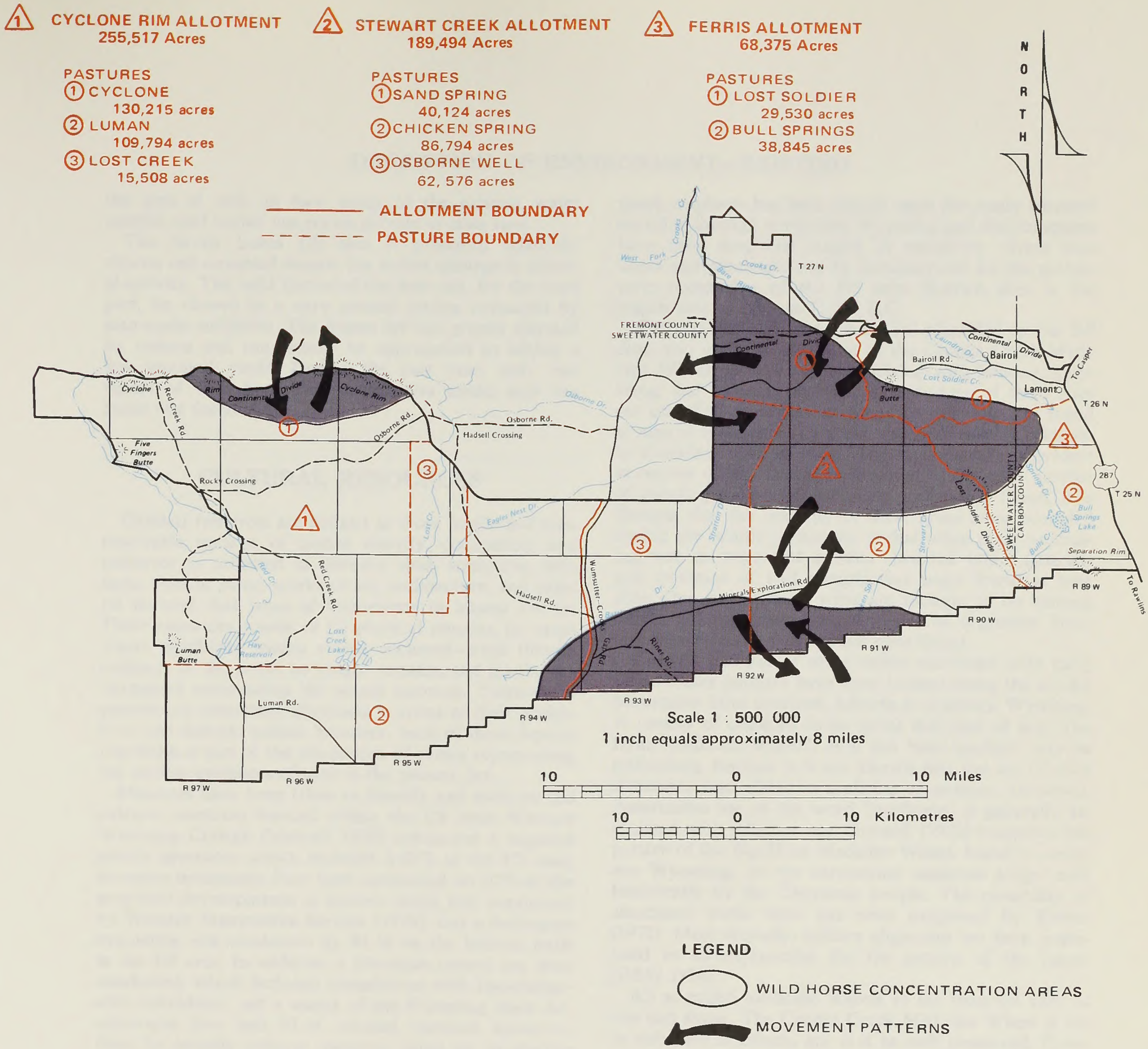
TABLE 2-32
WILD HORSE INVENTORY INFORMATION
WILD HORSE HERD DATA - SEVEN LAKES PLANNING UNIT*
RAWLINS DISTRICT, WYOMING

Inventory Count		Colts		Yearlings		Band Size			Number of Bands	Organization of Observer
		%-	Number	%-	Number	Min. -	Max. -	Aver.		
1. 151	March 1974	NI	NI	NI	NI	NI	NI	NI	NI	BLM
2. 194	March 1975	0.5	1	NI	NI	NI	NI	12.1	16	BLM
3. 233	Summer 1975	20.6	48	7.7	18	NI	NI	NI	NI	BLM
4. 238	March 4, 1976	11.3	27	NI	NI	4	34	11.9	20	BLM
5. 222	May 1976	NI	NI	NI	NI	NI	NI	NI	NI	Wyo. Game & Fish
6. 223	May 26, 1976	17.6	39	NI	NI	1	39	10.1	22	BLM
7. 307	Aug. 13, 1976	17.6	54	NI	NI	1	58	14.6	21	BLM
8. 214**	Aug. 17, 1977	16.4	35	NI	NI	NI	NI	9.3	23	BLM

NI = No information

*Inventory counts number 1 through 7 covered the Seven Lakes Planning Unit which is larger and includes the Seven Lakes ES area (refer to Map 2-19). The number of wild horses that would have been found only in the ES area is not possible to determine from these earlier inventories.

**The ES area, excluding the Ferris Allotment, was inventoried. A more detailed memorandum is included in the backup materials.



PRESENT WILD HORSE CONCENTRATION AREAS AND MOVEMENT PATTERNS

Seven Lakes Grazing

Environmental Statement

Map 2 - 17

the area at will. In fact, many of the existing water sources wild horses use are on private or state land.

The Seven Lakes ES area is presently relatively remote and unvisited despite the recent upsurge in mineral activity. The wild horses of the area can, for the most part, be viewed in a very natural setting unmarred by man-made intrusions. The horses are not greatly alarmed by visitors and can usually be approached to within a few hundred yards. During the past year, only one report of wild horse harassment was made, and one horse was found shot.

CULTURAL RESOURCES

Cultural resources are defined as those fragile and nonrenewable remains of human activity, occupation, and endeavor as reflected in districts, sites, structures, artifacts, objects, ruins, works of art, architecture, and natural features that were of importance in human events. These resources consist of (a) physical remains, (b) areas where significant human events occurred—even though evidence of the event no longer remains, and (c) the environment surrounding the actual resource. Cultural resources are commonly discussed in terms of their prehistoric and historic values; however, each of these aspects represents a part of the continuum of events representing the earliest evidences of man to the present day.

Measures have been taken to identify and evaluate the cultural resources located within the ES area: Western Wyoming College (Metcalf 1976) conducted a regional sample inventory which included 0.02% of the ES area; intensive inventories have been conducted on 20% of the proposed developments; a historic study was conducted by Western Interpretive Service (1976); and a helicopter evaluation was conducted by BLM on the historic trails in the ES area. In addition, a literature review has been conducted, which included consultation with knowledgeable individuals, and a search of the Wyoming State Archeologist files and BLM cultural resource inventory files. To identify cultural resources listed on, or eligible for nomination to the National Register of Historic Places, the February 7, 1978, *Federal Register* was reviewed and the State Historic Preservation Officer (SHPO) was consulted. None of the National Register sites are located in the ES area; however, two sites identified in the ES area are eligible for nomination to the National Register (Crooks Creek Medicine Wheel and Luman Ranch).

Since cultural resources eligible for nomination to the National Register have been identified within the ES area, appropriate documentation of compliance with Section 106 of the National Historic Preservation Act is being developed as outlined in 36 CFR 800.

Archeological Background

The ES area is situated between three major culture areas: the Great Plains, the Great Basin, and the Northwest Plateau. In describing human use of the region, much emphasis has been placed upon the easily traveled corridor through southwest Wyoming and the occupants have been described largely as transitory. Great time depth and continuity can be demonstrated for the prehistoric occupation of the ES area. Known sites in the region date as early as 11,200 B.C.

Forty prehistoric sites have been identified in the ES area, and with the exception of the Crooks Creek Medicine Wheel, all sites were associated with hunting, gathering, and camping activies. Twenty-nine of these sites are classified as campsites. Stone or tipi rings are found at nine of these camping areas, and firepits were positively identified at all of them. Tool manufacture is evident at twelve of the campsites. Because of the high number of grinding tools used for plant preparation found, it is thought that the majority of these areas were occupied during the middle prehistoric period when plant processing was an important activity. Isolated lithic materials and evidence of tool manufacture were found at nine sites. One site contains what are thought to be hunting blinds, although associated evidence of organized hunting activity in the area has not been found.

Circular patterns of stone cairns associated with early Great Plains cultures have been located along the Rocky Mountains from northern Alberta to southern Wyoming. A variety of opinions exists about this type of site. The term “medicine wheel”, as it has been applied, may be misleading, because it is not known that the use of such structures was related to medicine ceremonies. However, Amerindian use of the word “medicine” is generally associated with religious use. Grinnell (1922) compared the pattern of the Big Horn Medicine Wheel, found in northern Wyoming, to the ceremonial medicine lodge used historically by the Cheyenne people. The possibility of associated burial sites has been suggested by Kehoe (1972). Most recently, solstice alignment has been postulated as an explanation for the pattern of the cairns (Eddy 1974).

All so-called medicine wheels so far reported vary in size and shape. The Crooks Creek Medicine Wheel is not as elaborate as others, nor is it as well preserved. However, its unique pattern is conspicuous. Most commonly, stone structures found in the region are “tipi” or stone rings which were thought to be used for the construction of dwellings. Other types of stone structures such as alignments or wheels are rare and merit special attention.

The evaluation of cultural sites in the Seven Lakes ES area thus far has been based solely on the observation of surface features. This approach lacks the thoroughness of subsurface testing at each location, but in most cases it is felt to be adequate to determine if sites meet National Register standards.

Because surveying in the ES area has not been extensive, a predictive model based on the sample survey done by Metcalf (1976) serves to estimate where sites might exist in the region. Topographic variety determines the patterning of sites. The survey, which included the Seven Lakes, Sandy, and Green Mountain ES areas, revealed that 79% of the sites occurred around permanent and ephemeral streams, springs, and playa lakes. Aside from the dependence on water sources in an arid region, these areas offered a rich wildlife habitat and vegetation that provided an important food source. Two of the 40 identified archeological sites in the ES area were found during this survey, and both were located in the vicinity of a water source.

Every major sand dune sampled had at least one site; and because of the movement of sands, it is probable that more cultural material is buried. Evidence of bison kills, in the form of butchered and burnt bone, is commonly found in sand dunes. Components of a communal bison kill are an area of good grazing, a topography suitable for channeling animals to a pre-selected area, and a cuesta, cliff, arroyo, or situation suitable for jumping, corralling, or trapping animals.

Any terrain where there is considerable relief relative to the broader surrounding area such as buttes, escarpments, and very hilly areas are defined as breaks. In seven out of ten of the samples made in breaks, at least one site was found. The uplands, consisting of rolling country dissected by minor drainages, are the most common terrain in the ES area. Flatlands are characterized by a relatively featureless terrain with low relief. The least productive site areas are in flats and uplands where there is a lack of variety in vegetation and relief (See appendix B-2-23 for a more complete discussion of the research design used by Metcalf).

Heavy trampling damage from years of grazing in the Seven Lakes ES area has already occurred at many existing water sources and in draws. It is suspected that many archeological sites, both surface and subsurface, have already been heavily damaged or destroyed.

Historical

The Luman Ranch site located on private land in the proposed Cyclone Rim allotment is listed on the Wyoming Inventory of Historic Sites and has been determined to be eligible for National Register nomination. The desert ranch dates from about 1918 and served as headquarters for a sheep raising operation at the peak of the World War I sheep boom. It is an imposing ruin in the desert area, with many log buildings, dugouts and other structures standing. New oil and gas drilling activity is underway nearby and equipment and housing for the drilling activity are presently located on the site.

The only historical trail passing through the ES area is the Rawlins-Fort Washakie Stage and Telegraph Line. The stage line has state and local significance because of its importance as a major transportation route from 1878 to 1906 providing a passage to Lander and Fort Washakie for freight and travelers from the Rawlins rail line. There are no portions of the trail within the project area which have sufficient integrity to merit nomination to the National Register. A helicopter inventory conducted by the Rawlins BLM Office (1976) revealed that all visible portions of the trail passing through the ES area had either been severely eroded or used as access. The Bull Springs and Lost Soldier Stage Stations were the third and fourth stops out of Rawlins. There are two sheds at the Lost Soldier site, but it is believed that these are a result of the oil-field development of the 1920s. According to the survey conducted by Western Interpretive Services (1976), there is no cultural material remaining at the Bull Springs site.

VISUAL RESOURCES

Characteristic Landscape

The majority of the Seven Lakes ES area (95%) lies in a physiographic region known as the Great Divide Basin. This is the same physiographic unit wherein lies the nationally noted Red Desert. The remaining 5% of the ES area lies in the North Platte basin to the North. Both basins exhibit the same characteristic landscapes and will be discussed collectively in terms of the landscape features.

Landform

The landform is visually homogeneous, consisting of gradually rolling to nearly flat terrain. There is no dramatic landform contrast. Even the Lost Soldier Divide, which rises gradually to the horizon, is indistinct from the west. The view of Lost Soldier Divide from the east is more apparent because the uplift is facing east and the change in landform is therefore more distinct. There are no expansive rock outcroppings in the ES area; in fact, rock formations of any kind are rare. The only location where any rock can be seen is at the crest of Lost Soldier Divide and then only as a foreground element. This subtle landscape imparts an overwhelming sense of openness to the viewer. The subtlety is reinforced by the lack of contrast from the component elements. The visual form, as previously described, is not pronounced; the lines are indistinct except for roads and old seismic lines, the brown toned earth colors are homogeneous; textures are very fine to almost without texture.

Modifications to the natural characteristic landscape include roads, seismic lines, earthen reservoirs, petroleum pad construction, uranium exploratory holes, and the beginnings of a uranium strip mine. These modifications are very localized and are generally subordinate to the landscape.

Vegetation

Vegetation as a landscape feature in the Seven Lakes ES area is equally subtle. The vegetation consists of low shrubs, forbs, and grasses seldom exceeding 18 to 24 inches in height. Some scattered juniper occur on Lost Soldier Divide at the higher elevations, and Lost Soldier Creek supports a few scraggly aspen. The colors are silver greys to grey greens with seasonal bright greens and yellows from spring grasses and flowers. The color and line becomes more pronounced along northeast facing slopes—a product of more vigorous growth associated with snowpack. The color tones are richer and most dominant in the natural swales, which adds subtle definition to gradual, rolling terrain. The vegetative texture is nonexistent except in the immediate foreground.

The modification to the vegetative feature is synonymous to the modification previously described under landform. This is because the change in landform caused a reduction in plant material. In some cases, disturbed areas are becoming revegetated naturally. The scars are detectable because the invader plants differ in composition with the characteristic landscape.

Another condition common to present water sources is the trampling of vegetation by livestock (Figure 2-4). This denudes the area, adds fecal deposits, compacts the soil, and creates disharmony with the surrounding landscape.

Structures

Structures, all man-made in origin, tend to be the most dominant feature on this landscape. The type of structures that can be associated with visual intrusions in the ES area are gas and oil derricks, tanks, and equipment; uranium drilling derricks; and water development structures including cabins, tanks, troughs, and windmills, which occur mostly on state lands. (Refer to Mineral Resources for the status of development and Water Resources for the number of water developments in the ES area.)

A power line-pipeline corridor traverses the northern portion of the Sand Spring and Lost Soldier pastures. These structural elements of line, form, and texture are dominant in the foreground (Figure 2-5) but are scarcely visible for a distance in excess of 2 miles.

The oil fields, tanks, and the community of Bairoil, located in the northeast portion of the Ferris allotment, constitute the greatest assemblage of foreign elements found in the ES area.

Visual Resource Management Classes

Visual Resource Management (VRM) classes have been established for these public lands. The manner in which they were determined is explained in Appendix B-2-6. Each VRM class describes a different degree of modification allowed in the basic elements (form, line, color, and texture) of the landscape. These classes are therefore the basis for determining whether or not a modification would result in a visual impact. These classes are defined on Table 2-33 and the areas they cover are shown on Map 2-18.

RECREATION RESOURCES

The recreation use in the Seven Lakes ES area is relatively unique because there are no recreation facilities, and only one stream supporting game fish. This open terrain is special to many people, however. As Chapter 1 stated, the ES area lies in part of the Red Desert and for this reason, the area is of special value as "open space".

Some rockhounding is said to occur, but local clubs report very little use by their members. Petrified wood and arrowhead collecting are the dominant rockhounding attractions in the area and occur in small localized areas. Other user groups, such as the snowmobile clubs, seldom venture into the area.

Hunting constitutes the major recreational attraction to the area. The major species hunted are pronghorn, sage grouse, cottontail rabbits, and mule deer. This listing is in the order of hunting popularity of the species mentioned. Table 2-34 shows the recent hunter use in the ES area for sage grouse and pronghorn. Wildlife Figure 2-2 shows the relationship of the pronghorn and mule deer hunting areas to the ES area. The mule deer hunting areas 096, 098, and 099 have yielded average harvests of 97, 25, and 14 antlered mule deer respectively, from 1972 through 1975 (Wyoming Game and Fish). The pronghorn hunting areas, 060, 061, and 064 were scheduled for 100 (bucks only), 600 (any pronghorn), and 300 (any pronghorn) pronghorn licenses respectively for the 1977 pronghorn hunting season. Using the average hunter success from 1973 through 1975 for each hunt area (60—62%; 61—94%; 64—95%), the estimated harvest for the 1977 hunting season would be 62 pronghorn in area 060, 654 in area 061, and 285 in area 064. Of course, only a portion of these pronghorn and mule deer would be taken in the Seven Lakes ES area.

The Wyoming Game and Fish Department (January 1977b report) estimates the present fishing capacity of Crooks Creek to be approximately two anglers per mile. About 5¼ miles of Crooks Creek crosses the ES area. Using the Wyoming Game and Fish methodology from the report, this creek would be expected to have 11 recreation days of fishing.

To summarize known recreation use, the ES area has a total of 910 recreation days of use. This figure is the combined recreation days of pronghorn and sage grouse hunting, and fishing on Crooks Creek. There is also some incidental mule deer hunting use.

While other forms of recreation use may occur in the ES area, the extent is not predictable because of low use and sporadic occurrance.

WILDERNESS

Due to the fact that the Seven Lakes ES area is a large, unfenced, unoccupied, and largely undeveloped tract of public land, there is a certain wild quality inherent in much of it. Preliminary studies have identified a number of roadless areas in excess of 5,000 acres, the minimum size which could normally be considered for wilderness designation under the 1964 Wilderness Act (P.L. 88-577). Those areas together encompass most of the ES area.

No wilderness study areas have yet been established. It is not presently known what parts, if any, of the ES area will be identified as wilderness study areas. There are, however, four areas which have been identified as clearly not having wilderness qualities. They are: the Bairoil-Lamont area, consisting of approximately 10,000 acres; the Minerals Exploration Company mining area (T.24N.,

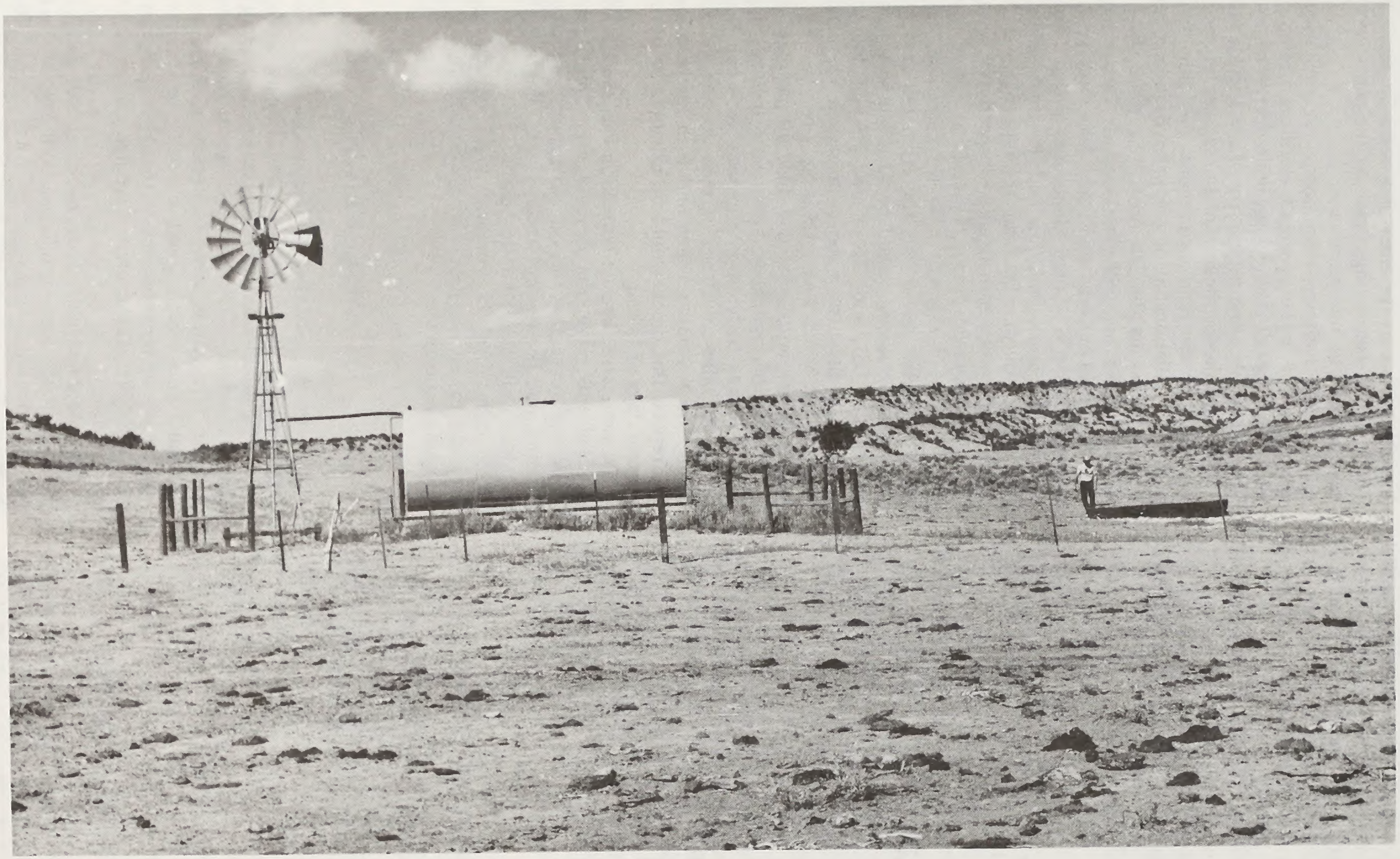


Figure 2-4

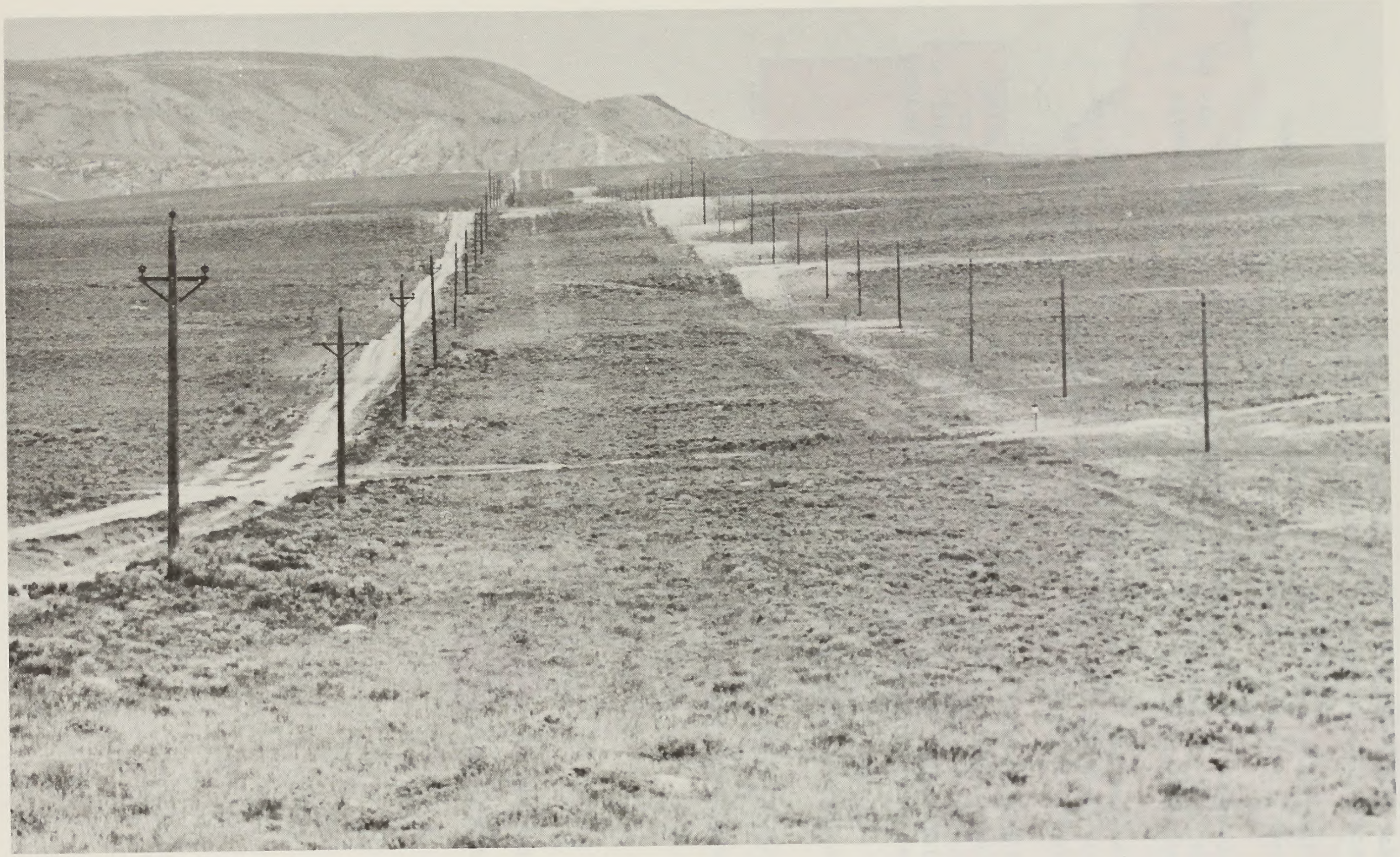


Figure 2-5

TABLE 2-33

VISUAL RESOURCE MANAGEMENT CLASS OBJECTIVES

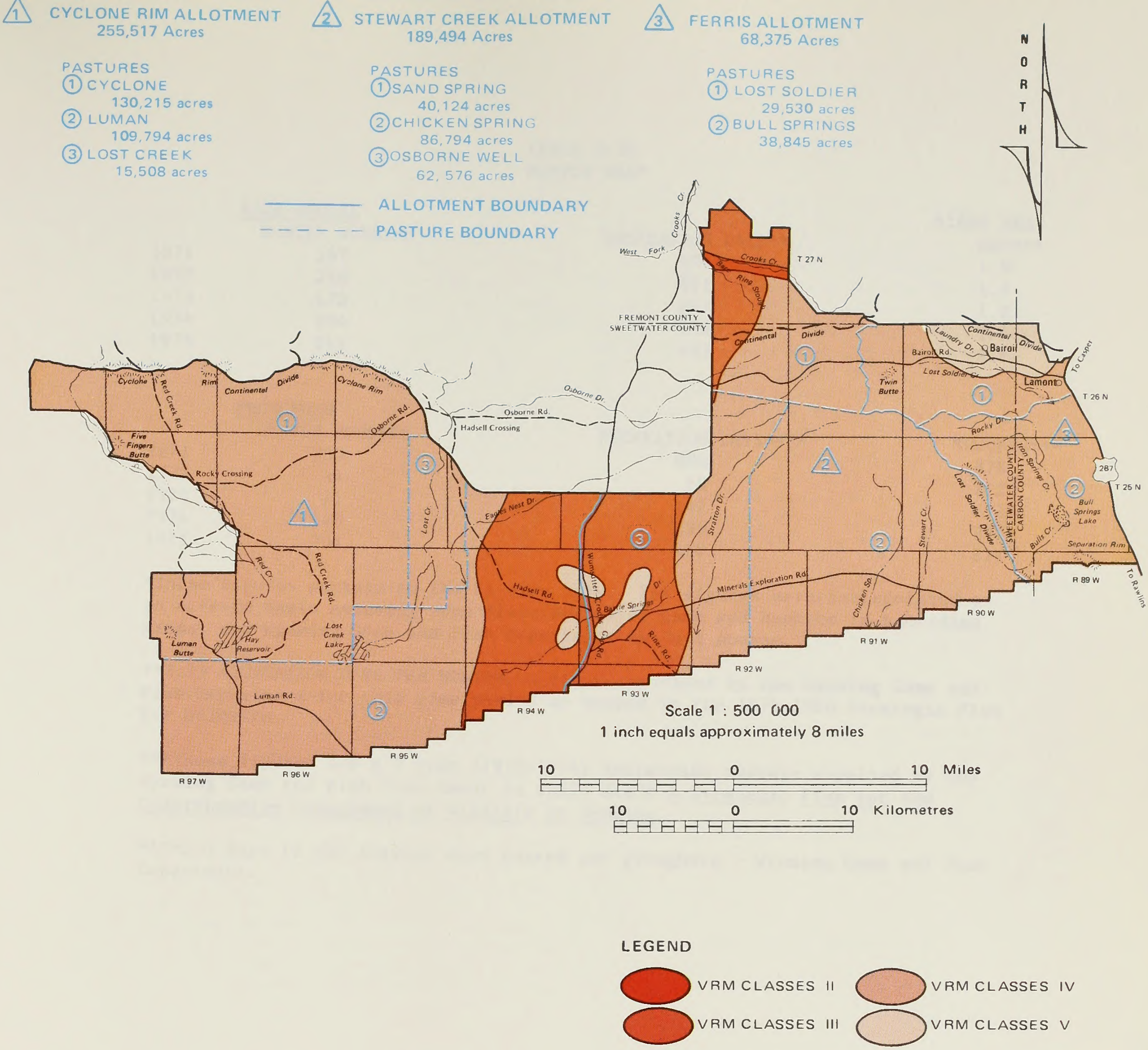
CLASS I - Natural ecological changes only. Primitive or natural area where management activities are restricted.

CLASS II - Changes in any of basic elements; form, line, color, and texture should not be evident in management activity.

CLASS III - Changes in basic elements (form, line, color, texture) may be evident in management activity. But changes should remain subordinate to visual strength of existing character.

CLASS IV - Changes may subordinate original composition and character but must reflect what could be natural occurrence within character type.

CLASS V - Change is needed, naturalistic character disturbed to point where rehabilitation is needed to bring back in character to surrounding countryside. An interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement.



VISUAL RESOURCE MANAGEMENT CLASSES

Seven Lakes Grazing

Environmental Statement

Map 2 - 18

TABLE 2-34
HUNTER USE*

SAGE GROUSE			
	HUNTER NUMBERS	RECREATION DAYS**	BIRDS PER DAY***
1971	167	376	1.9
1972	218	491	1.9
1973	172	387	1.9
1974	204	459	1.9
1975	219	493	1.9

PRONGHORN			
	HUNTER NUMBERS	RECREATION DAYS****	SUCCESS***
1971	300	600	87%
1972	34	68	87%
1973	71	142	87%
1974	148	296	87%
1975	204	408	87%

*These figures pertain to the ES area only. The figures were interpolated on an acreage basis assuming even distribution of game and hunters in recording areas, and Wyoming Game and Fish Department as data source.

**2.25 RECREATION DAYS PER HUNTER, a figure provided by the Wyoming Game and Fish Department for this time period as stated in the 1975-1980 Strategic Plan for Wildlife.

***These figures are a 5 year (1970-1974) state-wide average supplied by the Wyoming Game And Fish Department in their draft A Strategic Plan for the Comprehensive Management of Wildlife in Wyoming.

****2.0 days is the average days hunted per pronghorn - Wyoming Game and Fish Department.

R.93W.), consisting of approximately 23,000 acres; the Hay Reservoir area, consisting of approximately 35,000 acres; and the Crooks Creek-Green Mountain area, consisting of approximately 5,000 acres. This would indicate that approximately 440,000 acres or 85% of the ES area may have wilderness qualities and could conceivably be considered for wilderness study. These areas clearly have no wilderness potential because: Bairoil is the center of oil and gas production, the Hay Reservoir area is being developed for oil and gas production, the Minerals Exploration Co. area is a large developing uranium mining and milling area, and the Crooks Creek-Green Mountain area is both state owned lands and the site of major mineral development.

The Sierra Club, the Wilderness Society, Friends of the Earth, and other environmental groups strongly support the establishment of wilderness areas in the Great Divide Basin or Red Desert Region of Wyoming. During the Seven Lakes MFP hearings, several formal statements to this effect were received by BLM.

The wilderness inventory, in accordance with Sec. 603 (a) of the Federal Land Policy and Management Act (FLPMA), has not been completed on the public lands that would be impacted by the proposal. Prior to implementation of any actions, the areas will have to be inventoried and impacts on potential or existing wilderness areas assessed.

Until Congress acts on an area that has been designated for wilderness study, exisiting multiple-use activities, including grazing and supporting activities will continue. New uses or expanded existing uses will be allowed if the impacts will not impair the suitability of the area for wilderness.

LIVESTOCK GRAZING

Ferris Allotment

Both cattle and sheep are licensed to use the Ferris incommon allotment. Cattle use accounts for only 5% of the total licensed livestock use, and presently is made from May 1 to November 30. Sheep use the allotment from mid-October to April 30. The grazing seasons are based on traditional use, rather than on range plant physiological requirements. Today in the Ferris incommon allotment, eight livestock operators hold grazing privileges. Two operators run cattle and six run sheep (Table 2-35).

The grazing privileges were adjudicated to the operators in the late 1950s. The adjudication was inadequate by today's standards. It failed to specify class of livestock, season of use, specific areas of use, and did not take into account range suitability for grazing.

In 1976, a new range survey using the weight estimate method was completed for this allotment. This survey indicates there are 28% fewer animal unit months (AUMs) of forage available for livestock grazing than the 6,805 AUMs currently licensed. This survey also broke the forage down by class of livestock and found that the Ferris incommon allotment contains approximately twice the number of winter sheep AUMs as summer cattle AUMs. Range suitability by class of livestock was calculated for the ES area (Table 2-36).

Trailing livestock to and within the Ferris incommon allotment is confined to sheep, since cattle are normally trucked.

Due to lack of water, poor distribution of summer cattle is a major problem. The cattle are usually found only along Lost Soldier Creek and actually utilize very little of the allotment. There are no fences within the allotment to aid in distributing the livestock. The allotment is fenced across most of its northern boundary, across its southern limits, and on the east side. The western edge of the allotment is a fairly steep rim called Lost Soldier Divide. Sometimes cattle do drift over it.

In the Ferris allotment, the licensed active livestock use over the last 5 years (Table 1-1) has averaged 209 cattle AUMs and 3,335 sheep AUMs (Appendix B-2-15).

Of the six sheep operations licensed to graze in the Ferris allotment, only three, with 3,540 AUMs of qualifications, have actively been using most of their privileges. These three operators have a gentleman's agreement among themselves as to how the Ferris allotment is used. One sheepman keeps his stock in the southern half of the allotment while the two remaining operations utilize only the northern half. The three remaining sheep operators have been taking nonuse, or leasing the base property to which the federal grazing privileges are attached, for the past several years. One of the sheep operators (1,023 AUMs) who has been intermittently taking nonuse, is awaiting the required authorization from the BLM to convert to cattle use. One operation has 746 AUMs and plans to either take nonuse or lease the base property until an estate is settled. The third has indicated he would not request a conversion to cattle, but would probably continue to lease the base property to which his 155 federal AUMs are attached to another operator actively engaged in the sheep business.

Seven Lakes Incommon Allotment

Sheep and cattle are presently authorized to graze in what is named the Seven Lakes incommon allotment. This allotment is an unfenced area of approximately 600,000 acres, traditionally a winter sheep area, which includes the Stewart Creek and Cyclone Rim allotments of the proposed action as well as portions of two additional grazing allotments (Green Mountain and Arapahoe Creek). Map 2-19 shows the relative locations of these allotments.

Twenty-one livestock operations (seven cattlemen and fourteen sheepmen) hold grazing privileges in the Seven Lakes incommon allotment (Table 2-35).

The existing Seven Lakes incommon allotment is a vast area (roughly 25 miles north to south and 45 miles east to west) that is virtually without interior fencing. Livestock operators are not restricted to specific areas within the allotment. These situations have made effective livestock grazing management extremely difficult for

TABLE 2-35
PRESENT CLASS AND FEDERAL AUMS OF LIVESTOCK OPERATIONS IN ES AREA

Operations	Present Class	Present Qualifications (AUMs)
FERRIS INCOMMON ALLOTMENT		
A	Sheep	1,023
B	Sheep	1,763
C	Sheep	1,245
D	Sheep	746
E	Sheep	155
F	Sheep	532
G	Cattle	165
H	Cattle	176
Wyoming Game & Fish Commission	Sheep	1,000*
	Total Cattle =	341 AUMs
	Total Sheep =	6,464 AUMs
SEVEN LAKES INCOMMON ALLOTMENT**		
A+++	Cattle	529
B+++	Cattle	2,661
C+++	Cattle	662
D+++	Cattle	530
E+++	Cattle	3,280
F+++	Sheep	5,714
G	Cattle	1,836
H	Cattle	758
I	Sheep	2,618
J	Sheep	16,809
K	Summer Sheep	1,000
L	Sheep	3,340
M	Sheep	4,375
N	Sheep	3,602
O	Sheep	1,455
P	Sheep	1,253
Q	Sheep	1,144
R	Sheep	2,423
S	Sheep	7,651
T	Sheep	951
U	Sheep	1,142
Wyoming Game & Fish Commission	Sheep	4,341*
	Total Cattle =	10,256 AUMs
	Total Sheep =	57,818 AUMs

*Reserved for wildlife.

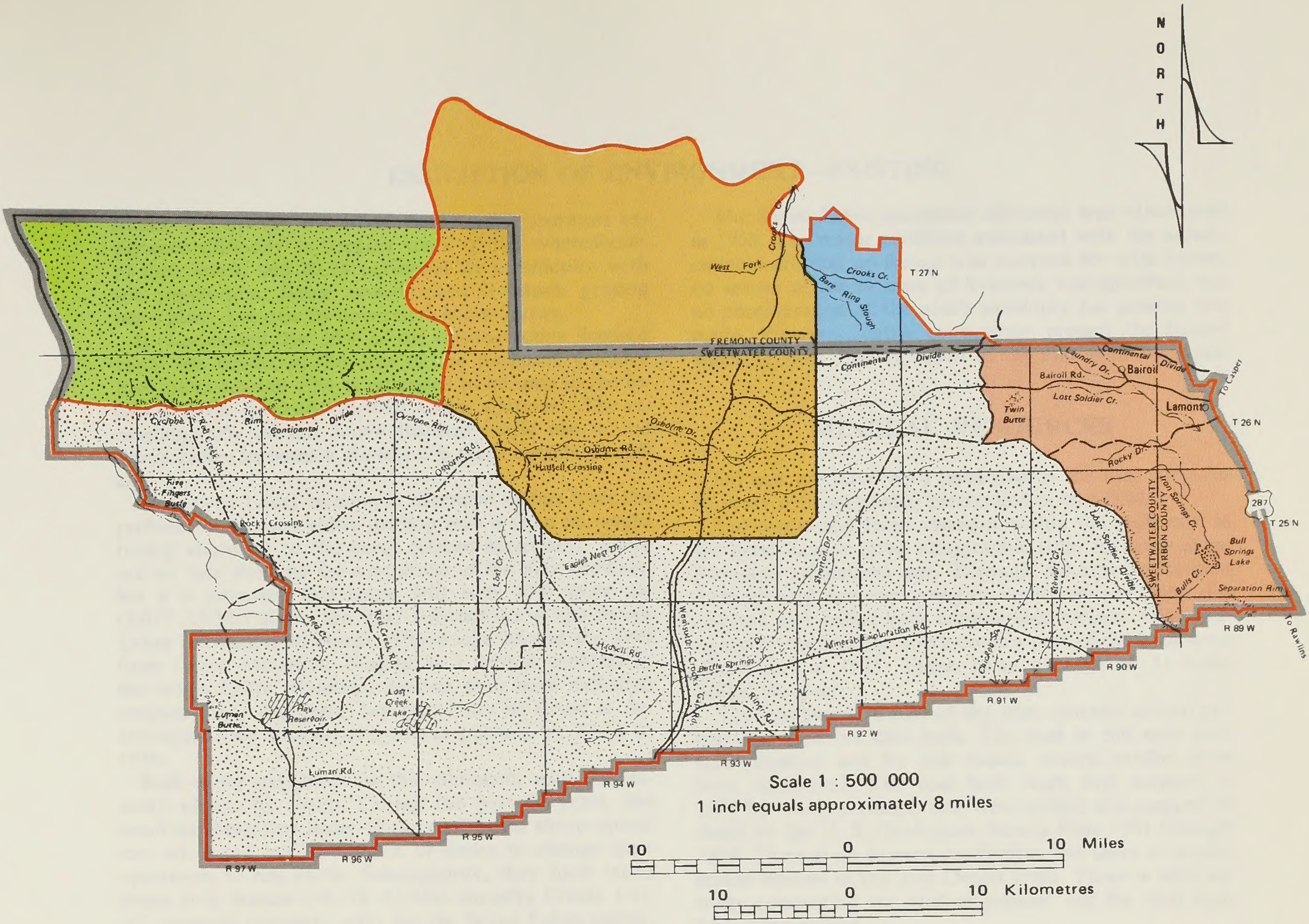
**The existing Seven Lakes incommon allotment is a large grazing allotment which includes all of the proposed Cyclone Rim allotment, most of the proposed Stewart Creek allotment, as well as significant portions of the Green Mountain allotment and the Arapahoe Creek allotment which lie outside the ES area (refer to Map 2-19).

+++These operations would take their use outside the ES area once the proposed action is implemented.

TABLE 2-36
ACREAGES BY SUITABILITY FOR EACH CLASS OF LIVESTOCK*

Allotment (acres)	Class of Livestock	Presently Suitable	Additionally Suitable When Water Developments are Operational	Additionally Suitable with Management (by 1998)	Unsuitable Presently and Through 1998
Ferris (68,345)	Summer Cattle	53,062	0	3,434	11,849
	Winter Sheep	61,171	0	2,616	4,558
Stewart Creek (188,991)	Summer Cattle	81,772	59,609	18,883	28,727
	Winter Sheep	188,634	0	0	357
Cyclone Rim (255,518)	Winter Cattle	80,495	149,416	0	25,607
	Summer Sheep	234,250	1,304	3,076	16,888
	Winter Sheep	237,498	0	0	18,020

*Refer to Appendix B-1-4 for suitability criteria.



LEGEND

🟥 FERRIS ALLOTMENT IN THE SEVEN LAKES PLANNING UNIT, DIVIDE RESOURCE AREA. (ALLOTMENT BOUNDARIES HAVE REMAINED CONSTANT.)

▨ THE FORMER SEVEN LAKES INCOMMON ALLOTMENT.

🟦 PORTION OF THE GREEN MOUNTAIN PLANNING UNIT, LANDER RESOURCE AREA TRANSFERRED TO THE SEVEN LAKES PLANNING UNIT, DIVIDE RESOURCE AREA. IT IS THE NORTHERN PORTION OF THE PROPOSED STEWART CREEK ALLOTMENT.

🟧 THE NEW ARAPAHOE ALLOTMENT CREATED BY COMBINNING PORTIONS OF THE GREEN MOUNTAIN PLANNING UNIT AND THE SEVEN LAKES PLANNING UNIT. THE ARAPAHOE ALLOTMENT IS NOT INCLUDED IN THE SEVEN LAKES E. S. BUT WILL BE COVERED IN THE GREEN MOUNTAIN GRAZING ENVIRONMENTAL STATEMENT.

🟩 PORTION OF THE FORMER SEVEN LAKES PLANNING UNIT, TRANSFERRED TO THE GREEN MOUNTAIN PLANNING UNIT.

▨ PRESENT SEVEN LAKES GRAZING ENVIRONMENTAL STATEMENT

━ NEW PLANNING UNIT BOUNDARY

━ FORMER PLANNING UNIT BOUNDARY

PRESENT AND PROPOSED BOUNDARIES

Seven Lakes Grazing

Environmental Statement

Map 2 - 19

livestock operators and BLM. Some cattle operators experience difficulty in keeping track of the whereabouts of their stock, and BLM personnel have difficulty with use supervision. Some unauthorized livestock grazing takes place, but exactly how much is not known.

It is estimated that 30% of the existing active licensed cattle use occurs in the area of the proposed Cyclone Rim allotment and 10% is estimated to be used in the location of the proposed Stewart Creek allotment. The remaining 60% of the active licensed cattle use in the Seven Lakes incommon allotment is taken outside the ES area.

The Seven Lakes incommon allotment suffers from the problem of summer cattle drifting into it from its neighboring allotment to the north (Green Mountain). There are no data showing the magnitude of the drift problem, but it is estimated that cattle drift adds 30% more use (3,077 AUMs) above the total licensed use in the Seven Lakes incommon allotment. Above and beyond the drift from Green Mountain, trespass is a serious problem in the Seven Lakes allotment. Several users have indicated trespass sheep and cattle can frequently be found in the allotment. One trespass action was pursued by BLM in 1976.

Both cattle and sheep use this allotment, with the majority of use by sheep. During the past 10 years, the trend has been that many of the established sheep operators are going out of business or desire to change their operations to run cattle. Subsequently, they have taken about 66% nonuse (35,158 AUMs) annually (Table 1-1). All livestock operators who use the Seven Lakes incommon allotment use it to complement their livestock operations on other BLM grazing allotments, U.S. Forest Service lands, state grazing leases, and/or private lands.

The seasonal patterns of grazing by livestock are based on the operators' historical use and desires rather than on physiological needs of plants and range readiness criteria. Cattle use is taken from May 1 to December 31. Sheep use is yearlong, but most is taken from October to May.

In the Seven Lakes ES area, excluding the Ferris allotment, an estimated use of 4,460 cattle AUMs and 18,101 sheep AUMs is made each year. This estimate was based on the licensed active use in the Seven Lakes incommon allotment and the amount of unauthorized use believed to be drifting into the allotment (Appendix B-2-15 & B-1-3).

One rancher has requested that some of his use be changed from winter sheep to winter cattle. Cattle are presently found during the winter in allotments adjacent to and south of the Seven Lakes ES area; nevertheless, winter weather makes winter cattle operations risky ventures. At times, bulldozers have been needed to rescue bands of sheep from winter snows. Riddle and Oakley (1972) reported that a 1971 blizzard in the Seven Lakes ES area lasted 4 days, covered 18 inch tall sagebrush with snow, and was immediately followed by over 2 weeks of subfreezing temperatures and ground blizzards.

Bad winters resulting in unusually high livestock mortality apparently hit about every 20 years—1927, 1949, 1971 (personal communication, Bernard Sun 1977). Table 1-1 and Figure 1-1 show the large amount of cattle nonuse that followed the most recent bad winters, those of 1971-1972 and 1972-1973.

The Seven Lakes incommon allotment was adjudicated in 1958. The major problems associated with the adjudication were that no forage was reserved for wild horses, no season of use or class of livestock was specified, and no consideration of the area's suitability for grazing was made. Presently, cattle concentrate around the limited watering sites, leaving much of the allotment ungrazed.

MINERAL RESOURCES

Oil and gas have been produced in the area for over 60 years with substantial production in two fields.

Lithologic and facies changes within the sediments in the basin have created stratigraphic traps for large accumulations of natural gas. Through modern exploration methods and new technologies, reservoirs are being discovered and drilled with considerable success. New stratigraphic traps in the southwestern part of the area were discovered in 1975. There is an average of 31 holes drilled per year.

The southwestern part of the area contains several potentially mineable coal beds. The coal in this area contains uranium and for this reason, several studies have been completed. The coal beds were first mapped in 1907 by reconnaissance, and were drilled and mapped in detail by the U. S. Geological Survey from 1951 through 1956. There is no present production, but there is considerable interest in the Red Desert coals. There is little activity concerning the coal at present, but the coal beds have been drilled.

Saline minerals, chiefly sodium sulfate and sodium carbonate, occur as evaporite deposits in dry lake or ancient playa lake beds. Because of the internal drainage of the basin, large accumulations of saline minerals are believed to exist. There is little activity concerning saline minerals, mainly due to distance from markets.

Uranium exploration, drilling, and claim staking intensified throughout the basin about 1954 and has continued until the present time so that most of the area is now covered by claims. More than 5 million feet of exploration holes have been drilled in the basin. Several economic deposits have been discovered and are available for mining.

LAND USE PLANS, CONTROLS, AND CONSTRAINTS

Local Government

The Seven Lakes ES area lies in parts of Carbon, Fremont, and Sweetwater Counties.

Sweetwater and Carbon currently have county zoning ordinances. Fremont is preparing a county zoning ordinance which may be adopted in 1978. The portion of the Seven Lakes area within Sweetwater County is zoned primarily for Agricultural (A) use, although two areas, one around the Bairoil area and the other including the Minerals Exploration Company uranium properties, are

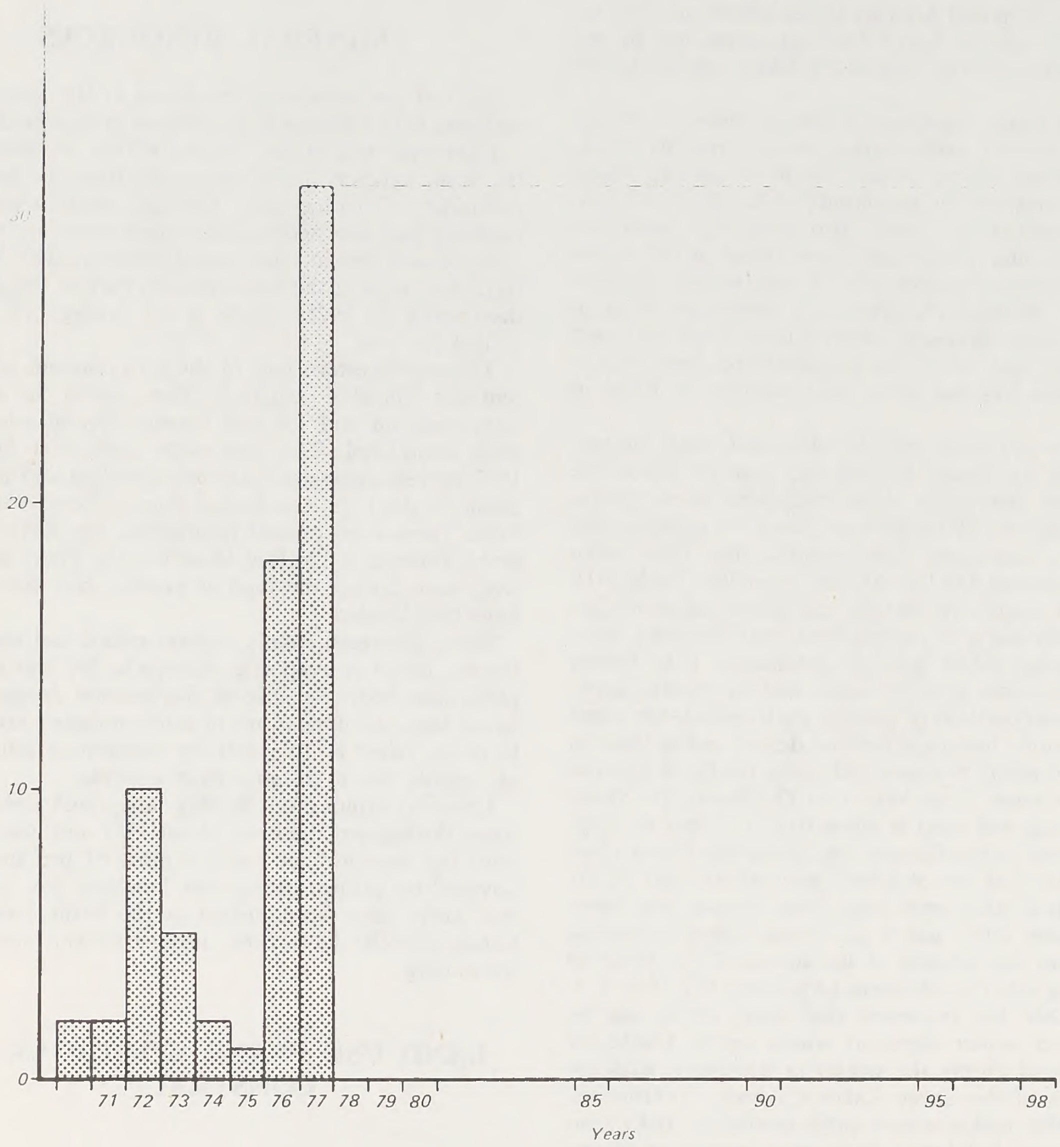


Figure 2-6
DRILLING ACTIVITY IN THE SEVEN LAKES ES AREA

zoned for Industrial (I) development. Livestock grazing and range improvement programs are consistent with both of these designations. (The industrial classification is needed to implement a mineral development project such as a mine, but not for mineral exploration activities.)

That part of Carbon County in the Seven Lakes ES area is zoned for Ranching, Agriculture, and Mining (RAM). Livestock grazing is consistent with this designation. A strip of land 2,000 feet wide on either side of Highway 287 in Carbon County, bordering the ES area, is classified as a scenic corridor. Livestock grazing is not in conflict with this land use designation.

Other Agencies

The Wyoming State Board of Land Commissioners has jurisdiction over some of the lands within the Seven Lakes ES area. The policies of the above agency are consistent with the existing use of area's resources. The applicable policies and uses are as follows:

Approximately 26,000 acres of state lands in the Seven Lakes ES area are leased to livestock operators for a 1 to 10 year term. The lessee is considered the guardian and manager of the land. The public may enter upon state land under lease, for hunting and fishing purposes. It is the policy of the Wyoming State Land Board to require sportsmen to advise the lessee of their intention to go upon state land prior to entry.

TRANSPORTATION NETWORKS

The major highway transportation system serving the region in which the Seven Lakes ES area lies, consists of Interstate 80 to the south, and Highway 287 which connects Interstate 80 at Rawlins to Lander to the north.

Rail transportation is provided by the Union Pacific Railroad which connects Rawlins and Rock Springs with both the east and west coasts. Scheduled air service is available in both Rawlins and Rock Springs.

The principal transportation system within the ES area consists of the Wamsutter-Crooks Gap road, the Luman road, the Bairoil road, and the Sweetwater County road, all of which are maintained, gravel surface county roads. BLM roads of some importance are the Riner road, the Hadsell road, the Osborne road, and the Red Creek road. Map 1-1 in Chapter 1 shows the major highway transportation system serving the ES area. Map 2-20 shows the principal transportation system within the ES area. In addition to the above maintained roads there are many miles of unmaintained, unimproved roads and trails throughout the ES area which are the result of mineral exploration, recreational activities such as hunting or off-road vehicle use, or livestock grazing and associated activities. Given good weather conditions there is no place in the ES area where one could not drive to within a mile or two in a pickup truck during the summer months. Road access for all of the current major activities in the area, on the whole, is adequate.

SOCIOECONOMIC CONDITIONS

This section describes the livestock operators presently licensed in the ES area who would be effected by the proposed action. Factors analyzed are income, employment, assessed valuation, social well-being, and socio-cultural attitudes. This was done so that the reader can more easily make a comparison between the present situation and the future situation in terms of the proposed action.

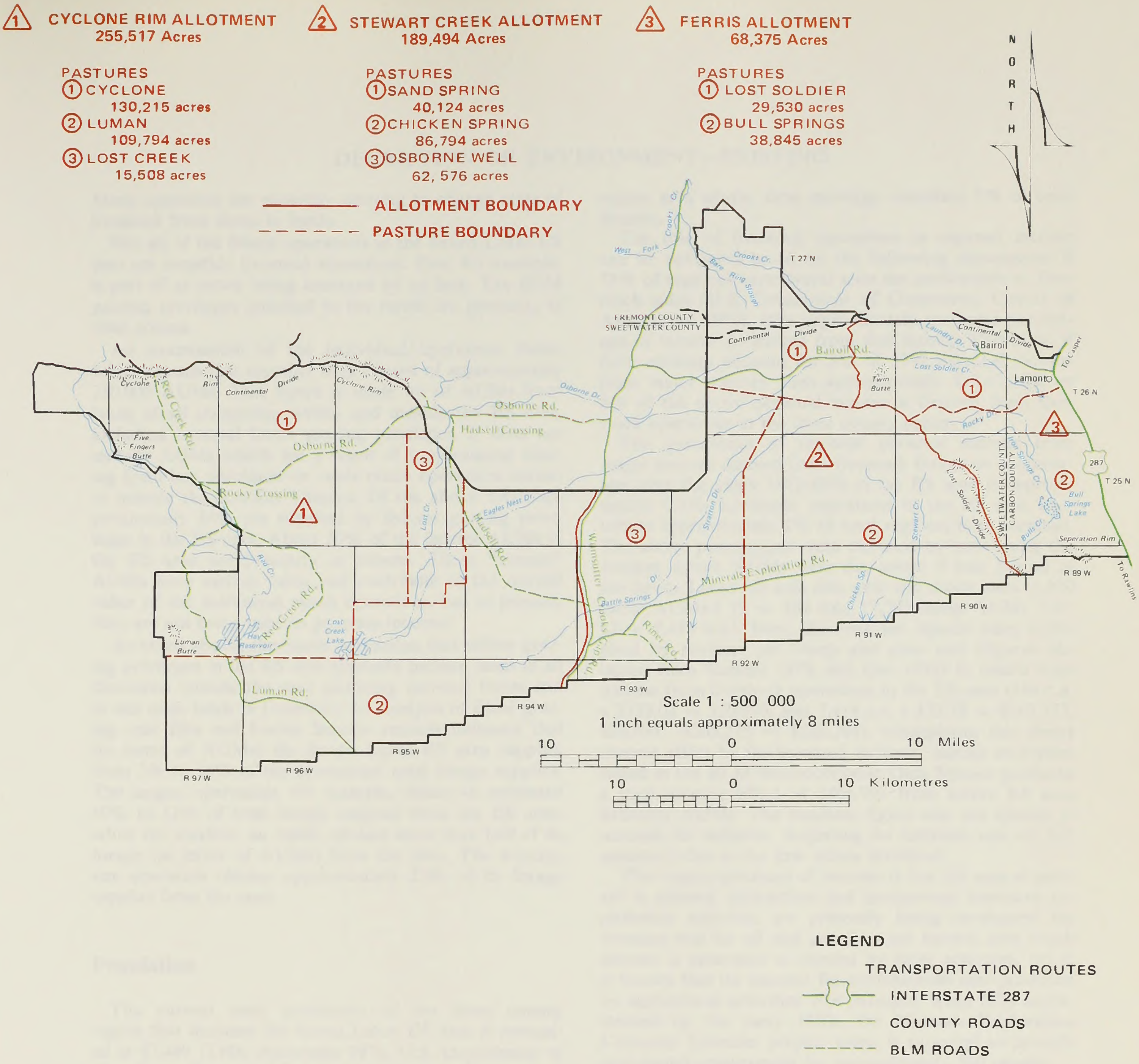
This section also describes the three county region, a part of which is made up by the ES area. This will facilitate the understanding of the ES area in terms of its impact on the regional economy.

The Seven Lakes ES area consists of parts of Carbon, Fremont, and Sweetwater Counties. Since socioeconomic data are usually reported only on a county basis, the analysis of socioeconomic conditions in this and subsequent chapters will, in part, include data describing those three counties as a whole. This approach is not without merit. First, there is no source of socioeconomic data for the ES area itself. Second, the permanent population of the ES area is estimated at approximately 350, all of which is associated with the oil industry at Bairoil and some highway business at Lamont. Third, all of the operators who would be affected by the proposed action or alternatives live outside the ES area itself but, with only one exception, in the three county area.

Seven Lakes ES Area Livestock Operators

Parts of fifteen livestock operations lie within the ES area boundaries. Of the fifteen, only eight can be defined as active operations. Seven of the eight operations are actually run by their owners as livestock operations while the eighth is only active in the sense that part of the operation is leased to one of the above seven active operations. Finally, two of the above seven operations are controlled by the same individual; therefore, there are eight operations in the ES area that are either all or partly active and which are presently controlled by six individuals.

No single livestock operator who uses the ES area can be described as typical of all Seven Lakes ES area operators. The operations are quite diverse in terms of size and the degree to which they depend on the public range lands. One operation stretches from the Sweetwater River in Natrona County through parts of Carbon, Fremont, and Sweetwater Counties. Other operations consist of only limited tracts of land outside the ES area. Some operators use all of their ES area grazing privileges while others are presently taking total nonuse. That is, some operators depend heavily on the ES area to sustain their livestock operations while others do not. Some of the operations are viable livestock operations while others are not, and are in fact leased to other livestock operators. The operator who has more ES area grazing privileges than anyone else (approximately 16,000 animal unit months—AUMs) is presently taking total nonuse.



TRANSPORTATION SYSTEM

Seven Lakes Grazing

Environmental Statement

Map 2 - 20

Many operators are presently desiring to change class of livestock from sheep to cattle.

Not all of the fifteen operations in the Seven Lakes ES area are bonafide livestock operations. One, for example, is part of an estate being managed by an heir. The BLM grazing privileges attached to the ranch are presently in total nonuse.

An examination of the individual operations themselves reveals that together they consist of approximately 230,000 AUMs. This figure is made up of AUMs from lands of all ownership within and outside the ES area, including national forest grazing privileges. It does not include AUMs which are a result of supplemental feeding from hay purchases or other ranch operations entirely outside the Rawlins District. Of the above total, approximately 24% are supplied by federal grazing privileges in the ES area. About 50% of the federal AUMs in the ES area are presently in nonuse. These "nonuse" AUMs have market value and contribute to the overall value of the individual ranch operations, but at present, they are not being used to generate income.

As noted above, the ranch operations that utilize grazing privileges in the ES area typically include lands in all directions outside the area including national forest and in one case, lands in Colorado. An analysis of BLM grazing case files and Forest Service records indicates that (in terms of AUMs) the Seven Lakes ES area supplies from 5% to 55% of the operations' total forage supplies. The largest operations, for example, obtain an estimated 10% to 12% of total forage supplies from the ES area, while the smallest, an estate, obtains more than half of its forage (in terms of AUMs) from the area. The average size operation obtains approximately 23% of its forage supplies from the area.

Population

The current total population of the three county region that includes the Seven Lakes ES area is estimated at 87,449 (THK Associates 1976, U.S. Department of Commerce, Bureau of Census 1975, and personal communication, Fremont County Planning Office). Sweetwater County accounts for 44% of the total population or 38,310. Carbon County has 22%, or 19,100; and Fremont County has 34%, or 30,039. The population of the nearest community of any appreciable size, Rawlins, is 11,840 (Bickert, Brown, Coddington, and Associates 1976). Jeffrey City, to the north has an estimated population of 1,800; and Rock Springs and Green River have a combined population of 32,219.

Regional Income

Table 2-37 indicates 1972 personal income by major sources for the three county region within which the Seven Lakes ES area lies. Farm earnings account for 12% of personal income in Carbon County, 6% in Fremont County, and 5% in Sweetwater County. For the region as a whole, farm earnings constitute 8% of total income.

The role of livestock operations in regional income can be estimated based on the following assumption: if 75% of regional agricultural sales are attributable to livestock sales (U.S. Department of Commerce, Census of Agriculture 1974), then approximately the same percentage of income is derived from that source. Therefore, if farm earnings account for 8% of 1972 personal income from major sources, then approximately $12,616,500 or 6% of the above personal income is derived from livestock operations in the three county region.

The percentage of regional personal income from major sources derived from livestock forage on the average over the years 1972-1976 in the ES area is approximately 0.1%. Livestock operations in the ES area contribute approximately 2% of total regional farm earnings. The above percentages were obtained by converting the average active AUMs over the above 5-year period in the Seven Lakes ES area into cow and sheep units (1,970 cattle AUMs [12 = 164 c.u.; 17,793 sheep AUMs x 5/12 = 7,414 s.u.). Next, the resultant figures were multiplied by revenue per sheep and cow unit (figures obtained from Stevens 1975; and Gee 1975) to obtain total income from livestock operations in the ES area (164 c.u. x $128.02 = $20,995; and 7,414 s.u. x $35.78 = $265,273; $20,995 $265,273 = $286,286). Multiplying this direct income effect by the livestock industry income multiplier found in the BLM Socioeconomic Data System produces a total income effect of $466,903 from active ES area livestock AUMs. The resultant figure was not ajusted to account for inflation. Adjusting for inflation was not felt necessary due to the low values involved.

The largest producer of income in the ES area at present is mineral exploration and production. Intensive exploration activities are presently being conducted for uranium and for oil and gas. It is not known how much income is generated at present by these activities, but it is known that the amount far overshadows that produced by agricultural activities. For example, when fully implemented by the early 1980s, the Minerals Exploration Company Uranium project alone is expected to provide year-round employment for approximately 360 people.

ES Area Income

Income for livestock operations and recreational activities was estimated for the two allotments in the ES area for the present situation. These figures are shown in Table 2-38. The data in the table are estimates of activities which occur in the ES area only. Actually, all livestock operators, except those who run livestock in the Ferris incommon allotment, are licensed to run livestock throughout the present Seven Lakes incommon allotment. The estimates are based on actual use patterns and present average active livestock use. To use present licensed use rather than average active use would be misleading, since a high percent of the AUMs are currently not being used to generate income. It is assumed that nonuse will continue at approximately the same level as has occurred over the past 5 years. The figures shown in

TABLE 2-37

1972 PERSONAL INCOME BY MAJOR SOURCES

	Carbon	Fremont	Sweetwater	Total
Farm Earnings	$ 6,982,000	$ 5,071,000	$ 4,769,000	$16,822,000
Government Earnings	8,149,000	16,385,000	9,975,000	34,509,000
Manufacturing	5,214,000	3,904,000	1,834,000	10,952,000
Mining	12,945,000	21,087,000	22,618,000	56,650,000
Contract Constuction	3,782,000	6,790,000	22,160,000	32,732,000
Transportation, Communication, and Utilities	7,513,000	4,058,000	9,420,000	20,991,000
Wholesale and Retail Trade	7,016,000	11,251,000	9,499,000	27,766,000
Finance, Insurance, and Real Estate	1,161,000	2,131,000	1,193,000	4,485,000
Services	5,702,000	7,707,000	6,709,000	20,118,000
Other	178,000	444,000	56,000	678,000
TOTAL LABOR AND PROPRIETORS EARNINGS	$58,642,000	$78,828,000	$88,233,000	$225,703,000

Source: Wyoming Employment Security Commission

TABLE 2-38
INCOME FROM LIVESTOCK AND RECREATIONAL ACTIVITIES IN THE SEVEN LAKES ES AREA UNDER THE PRESENT SITUATION*

Income Category	Allotment Ferris	 Seven Lakes Incommon	Total
Livestock	$51,910	$234,358	$286,268
Recreation	8,390	25,169	33,559
Total	$60,300	$259,527	$319,827

*The present situation is defined as average active livestock use over the years 1972-1976. This amounted to 1,970 cattle AUMs and 17,793 sheep AUMs.

Table 2-38 represent income which would be generated by livestock and recreation (hunting) activities in the area. Livestock income based on average active livestock use for the past 5 years and recreation income is based on the 1976 use levels. As shown in the table, direct income equals $319,827. The previously mentioned multiplier effect produces a total income effect from the activites of $521,638. It should be noted that the livestock income data shown in Table 2-38 represent income from BLM lands. The AUM breakdown in the ES area, like the land ownership pattern, is approximately 95% BLM, and 5% state and private. Livestock income would likely break down accordingly.

Income under the present situation was also calculated for livestock and hunting activities for each of the years during the 20-year analysis period (1987-1998). These income figures were then discounted at 6 5/8% to present value and summed. The resulting figure represents the present value of 20 years worth of livestock and hunting income. This figure equals $3,954,961.

No economic value is attributed to wild horses under the present situation. It is possible that persons do visit the ES area to view wild horses, thus generating recreation income. No data are available on this activity, however, and it is unlikely that the proposed action would affect it. The subject will, therefore, not be pursued further.

No forage allocation has ever been made for wild horses, so no economic value in the form of an opportunity cost can be attributed to them under the present situation (see methodology for determining wild horse values in Appendix B-3-7).

Employment

Table 2-39 shows employment by type and broad industrial sector for the counties in the region (Wyoming Department of Administration and Fiscal Control 1975). As seen in the table, government (19%), mining (20%), construction (10%), and trade (19%) are the most important employment sectors in the three county region. Farm employment in the region makes up 3.6% of total regional employment. The figures do not indicate that portion of agricultural employment that is attributable to livestock production, but a representative estimate can be made based on livestock sales. According to the 1974 U.S. Census of Agriculture, 75% of total agricultural commodity sales in the region in 1974 are attributable to livestock. Assuming that labor requirements for different agricultural activities are similar, livestock operations should account for approximately 75% of total agricultural employment. This means that approximately 2.7% of total regional employment is attributable to livestock operations.

An estimate of the contribution of Seven Lakes ES area livestock forage to regional livestock employment was calculated using average manpower figures derived for cattle and sheep operations in published data (Stevens 1971 and 1975) and applying them to area livestock forage. It was determined that the equivalent of approximately 9.09 jobs were generated by active ES area BLM livestock forage on the average over the years 1972-1976 (see Appendix B-3-7 for methodology and calculations). This constitutes approximately .01% of total regional agricultural employment and a virtually unnoticeable percent of total regional employment.

Presently, the mineral industries in the Seven Lakes ES area may provide as much as 500 man equivalents employment. One uranium mine and mill is in the development stages. A major oil and gas exploration and development program is being conducted, and uranium exploration is being conducted throughout the area. The above figure is based on knowledge of the area only, since no other sources of data are available. Based on the above employment estimate, it can be concluded that mineral exploration and development is the dominant economic activity in the ES area at present.

Furthermore, the Lost Soldier and Wertz oil fields, located near Bairoil, indirectly provide employment in Sinclair and Rawlins, Wyoming because the refinery at Sinclair is dependent on oil from the above fields for a large part of the basic supply of crude oil. In fact, the location of the refinery at Sinclair resulted from the existence of the oil fields at Bairoil.

Public Finance

The contribution to assessed valuation within the three county region from various sources is shown for 1976 in Table 2-40.

As seen, cattle and sheep contribute a very small percentage of total assessed valuation in the region (1.4%).

The contribution of Seven Lakes ES area AUMs to regional assessed valuation was estimated using the methodology in Appendix B-3-7. Assessed valuation based on average active use for the years 1972-1976 for livestock in the ES area is estimated to be $42,888.

Social Well-Being

The economic climate of the three county area has improved since 1970, notwithstanding the livestock industry. Population loss from the area has been reversed since 1970, and unemployment is significantly below national levels. Carbon County, for example, is reputed to have an unemployment rate of less than 3% (personal communication, Job Service of Wyoming 1977).

The average weekly wage for covered employment in 1974 in Carbon County was $171.58, while the average for the state was $154.86. Similarly in 1977, the respective weekly wage figures were $234 and $209, indicating that the ES region is in a good economic position relative to the state of Wyoming (Wyoming Employment Security Commission 1974, 1977). Employment trends are similar and as previously indicated the economic growth has been largely a result of mineral industry activity.

Most of the ranch operations in the Seven Lakes ES area have been in existence since the early part of this century. One has been in operation since 1872. This indi-

TABLE 2-39
1972 EMPLOYMENT BY BROAD INDUSTRIAL SECTOR

Employment Sector	Carbon	Fremont	Sweetwater	Total
Farm	405	298	202	905
Government	1,257	2,222	1,363	4,842
Manufacturing	400	476	186	1,062
Mining	1,007	1,914	1,991	4,912
Construction	313	556	1,690	2,559
Transportation, Communication and Utilities	661	422	835	1,918
Trade	1,225	1,804	1,703	4,732
Finance, Insurance, and Real Estate	120	210	164	494
Services	820	1,329	1,332	3,481
Other	3	49	4	56
TOTAL EMPLOYMENT	6,211	9,280	9,470	24,961

Wyoming Department of Administration and Fiscal Control 1975.

Wyoming Data Handbook 1975, Cheyenne, Wyoming.

TABLE 2-40

1976 TAXABLE VALUATION BY CATEGORY
FOR THE THREE COUNTY REGION
CARBON, FREMONT, SWEETWATER

	Amount	Percent
Lands	$ 15,416,033	2.7
Land Improvements	14,877,482	2.6
Town Lots and Improvements	63,608,652	11.6
Coal, Oil & Gas, and Uranium Production	247,993,553	44.1
Miscellaneous Mineral Production	75,263,495	13.4
Pipelines	11,493,777	2.0
Railroads	29,464,794	5.2
Public Utilities	16,457,978	2.9
Cattle & Sheep	7,995,041	1.4
Other Livestock	253,569	0.1
Construction Equipment	2,337,193	0.4
Farm Machinery	1,791,118	0.3
Mine Machinery & Sawmills	11,067,806	2.0
Oil Refiners, Oil & Gas Producing Equipment, Gas Plants & Other Industrial Plants	$ 64,307,697	11.4
TOTAL	$562,328,188	100.1

Source: Wyoming Department of Revenue and Taxation. 1976.

cates that they have been fairly stable in the long run. The BLM has no knowledge however, of the position the operators would occupy on a continuum of social well-being in the area.

Socio-Cultural Attitudes

With respect to livestock operators and mineral industry personnel, most strongly support the philosophy of multiple use management of public lands. Both groups believe strongly in the social, traditional, and economic importance of their vocations. They believe that continued multiple use management, including livestock grazing on public lands, is both desirable and needed to supply food and energy to regional and national markets as well as to maintain the economic base of the area.

All livestock operators who use the ES area are in favor of the proposed installation of range improvements. The ranch operators have consistently expressed a desire to see management of the area intensified to include construction of fences and development of water. The construction of the Arapahoe allotment boundary fence is supported by ranch operators both from the Rawlins and Lander areas. (The above summarizes opinions expressed by the area ranchers at meetings with Rawlins District BLM personnel during and after the development of the Seven Lakes MFP and prior to writing this ES.)

A segment of the population consisting of wildlife, recreation, and environmental groups is strongly in favor of protection of wildlife and open space values in the area. Fairly strong sentiment exists within these groups against fencing or major mineral development (Public Participation Record, Seven Lakes MFP Hearings).

FUTURE ENVIRONMENT

This section describes the resources and land uses that will probably be found in the Seven Lakes ES area in 20 years (1998) without implementation of the proposed action as described in Chapter 1. This time frame was selected because it is the point at which the objectives of the proposed action would be expected to be met.

No significant changes from the existing situation is expected in climate or topography.

Changes in mineral resource activity will be expected to influence most other resources. (Refer to the Mineral Resources section for a detailed discussion of the expected increases in this activity.)

Livestock management will continue as it exists today, with some changes in livestock class (refer to the Livestock Grazing section for details). Pursuant to management framework plan (MFP) decisions, the Lander area livestock operators will take their use outside the ES area.

Herd management area plans (HMAPs) and habitat management plans (HMPs) will be implemented to manage wild horses and wildlife habitat. The implementation of HMPs will include constructing some water developments and protective riparian fencing.

AIR QUALITY

By 1998, with increased uranium and coal mining, and a powerplant, air quality could be expected to be poorer than it is now. The changed air quality will depend on the locations mined since pollutants will be dispersed by winds and carried generally towards the east northeast (Table 2-2). In areas immediately adjacent to these possible sources of pollutants, air quality will be degraded by suspended particulates as well as other pollutants. An air pollution diffusion model considering types and the extent of developments is the only way to determine whether or not air quality would be degraded sufficiently to exceed state and federal air quality standards.

PALEONTOLOGICAL RESOURCES

Vertebrate fossils in the ES area are subject to unauthorized collection, and within 20 years, loss of resources to private collectors could have an effect upon data available for scientific study.

It is expected that proposed coal and uranium development could disturb fossil-rich areas through mining operations. Approximately 20,000 acres will be disturbed through mineral exploration and development. The paleontological resources in disturbed areas will be destroyed.

SOILS

It is anticipated that there will be no measurable change in the soil resource as a result of future grazing use. However, the mineral industry (oil and gas, coal, uranium) will disturb approximately 20,000 acres of which approximately 6,000 acres will be reseeded by 1998. The effects on the soil profiles in the disturbed areas will range from complete obliteration to removal of the A-horizon. The soils which have been subjected to only minor disturbances should be revegetated by root stock of species presently occupying the site. At this time, it is not possible to estimate reclamation success, sedimentation rates, acres in a reduced productivity state, or erosion condition.

WATER RESOURCES

By 1998, water consumption in the Seven Lakes ES area will increase significantly due to minerals activity, while livestock and wildlife use of water will remain near present levels. Oil and gas drilling, as well as production, will continue to use more water each year. Uranium and coal mining activities do not utilize much water in the mining and milling processes, but the uranium and coal bearing zones of the area tend to also be groundwater aquifers. Because of this, large amounts of water must be disposed of. The Minerals Exploration Mine expects to continuously dewater an average of 7,000 gallons per minute (gpm), or nearly 11,300 acre-feet per year (ac ft/yr) (Stone and Webster Engineering Corporation 1977). With other (possibly as many as seven) uranium mines expected, the amount dewatered each year could be higher. A coal-fired power plant in the area will require large amounts of water and could utilize water produced from mines. The total consumption of water for mineral activities is not possible to predict because of the absence of firm projections and needs.

It is not likely that the increase in water needs of industry will interfere with the small amounts needed for livestock and wildlife except for localized problems with stock wells within the zone of influence of larger industrial wells. Pumping of an aquifer for either dewatering or industrial use will create a cone of depression on the water table around the wells, and if encountered water is discharged to evaporate or infiltrate, a bulging of the water levels around the discharge area is seen (Woodward-Clyde Associates 1976). Stock wells could have increased or decreased (could even go dry) flows, depending on which zone of influence they were in.

With dewatering and disposal activities, mixing of groundwaters from different aquifers and thus mixing waters of different qualities will likely occur. This practice could drastically change the quality of water in some of the aquifers, and thus, the quality of stockwater wells. It is not possible to predict how many stockwells will be altered by changes in supplies and/or qualities.

Storm runoffs in the Seven Lakes incommon allotment will be likely to increase due to the many disturbances by mining activities. These disturbances include mill sites, areas being revegetated, mined areas, and structures to divert runoffs around uranium and coal pits. The possible magnitude of the increase in runoffs is unknown, but would be likely to also increase sediment discharges by way of increased channel and sheet erosion.

VEGETATION

Olsen and Hansen (1977) have shown that during the summer, fall, and winter seasons in the Red Desert, cattle and sheep have dietary overlaps of 35%, 41%, and 46%, respectively. Continuous grazing yearlong by livestock will not allow the vegetation to regain vigor and carbohydrate reserves. Production, in 1998, will as a result of the continuous yearlong grazing, be expected to decrease approximately 5%.

Increased mineral activity proposed for the Seven Lakes ES area, by 1998, will cause an additional decrease in production of forage of 4%. Though most mining activities are required to be rehabilitated, full restoration of vegetation to its present production level by 1998 will not be possible (refer to Mineral Resources, Chapter 2 Future for total acres disturbed by mineral activity).

The predicted production in 1998 will be 91% of the existing production level (see Table 2-41).

Changes in composition will be expected following rehabilitation. An increase in the vegetation species planted during rehabilitation will be expected to occur while a decrease will occur in the species disturbed by the mineral activities. The amount of decrease or increase will be dependent upon the success of the rehabilitation measures.

Table 2-41 compares present production and key species composition with the predicted production and future key species composition in 1998.

The acreage of each condition class of the vegetation will not be expected to change from the present situation. Grazing will not be expected to be different in 1998 from the present situation. Therefore the condition and trend will remain the same.

Garrison (1972) stated that fall and winter seasons are the least detrimental period for utilization of shrubs. Late spring and the middle of the growing season, when the carbohydrate reserves are the lowest, are the most damaging periods of use. Cook and Stoddart (1963) state that harvesting during the winter and again during late spring are the most detrimental. Grazing would take place from May 1 to November 30 by cattle and October 31 to April 30 by sheep in the Ferris allotment; while from May 1 to December 31 by cattle, May 16 to October 14 by sheep, and October 15 to May 15 by sheep in the Seven Lakes allotment. Grazing during the growing season will reduce the ability of the vegetation to maintain vigor. Defoliation will reduce the amount of leafy material used in production of carbohydrates. As the carbohydrate reserve is depleted and not replenished, the vigor of the vegetation will decrease. Changes in plant vigor generally precede changes in the botanical composition and range deterioration (Cook and Child 1971).

Poisonous plants will increase 1% or 2% by 1998. The major increase will occur in areas of extensive disturbance. Areas in which reclamation was unsuccessful will be susceptible to invasion by poisonous plants. The major increase will occur in the saline soils in the Cyclone Rim allotment. There is a vast amount of strippable coal present in this area and large amounts of greasewood are also present; therefore, if the coal is mined, the greasewood could expand. Arrowgrass may tend to spread in wet bottomlands which may receive excessive grazing pressure.

Range Improvements

Present range improvements will continue to exist; therefore the effects of improvements upon vegetation would be unchanged.

Threatened or Endangered Species

The future situation of the threatened or endangered species will not be expected to be different from the existing situation. There are no threatened or endangered species known to exist within the ES boundary, but the possibility of occurrence is probable.

TABLE 2-41
PREDICTED PRODUCTION AND FUTURE KEY SPECIES COMPOSITION IN 1998 ON PUBLIC, STATE, AND PRIVATE LAND WITHOUT IMPLEMENTATION OF THE PROPOSED ACTION COMPARED WITH PRESENT PRODUCTION AND KEY SPECIES COMPOSITION*

Allotments and Vegetation Types	Present Production (AUMs)	Present Key Species Composition %				Future Production (AUMs)**	Future Key Species Composition % ***			
Ferris	5,625	Agda	Orhy	Pose	Artr	5,120	Agda	Orhy	Pose	Artr
Sagebrush		16	2	2	29		10	2	2	25
Grass		20	5	2	16		15	5	2	15
Greasewood		10	8	2	T		10	8	2	T
Seven Lakes****	50,476	Agda	Artr	Atnu	Orhy	45,933	Agda	Artr	Atnu	Orhy
Sagebrush		8	26	7	4		5	22	5	4
Grass		15	10	7	2		10	8	5	2
Saltbush		-	5	38	-		-	3	35	-
Greasewood		-	2	28	-		-	T	25	-

*All AUMs are expressed on a winter sheep basis.

**Refer to the narrative for explanation of determination of the future production.

***Refer to Appendix B-2-14 for methodology in predicting future key species composition.

****The Seven Lakes allotment occupies the same area as the proposed Stewart Creek and the Cyclone Rim allotments.

ANIMALS

Terrestrial Wildlife

It is expected that the proposed wildlife habitat management plan (HMP) will be implemented. As a result of this activity plan for the Seven Lakes ES area, some waters will be developed for pronghorn and sage grouse use on summer range. Several springs will be developed, reservoirs and riparian areas fenced, and fences modified. Major fences will not be constructed, thus allowing unrestricted movement by pronghorn during migration periods.

Since active livestock use is expected to remain at about the present levels, the amount of vegetative cover and forage available to wildlife (not including vegetation lost from other activities) would remain at about present levels. Thus, those populations presently being supported by the extensive livestock nonuse would still be residing in the area. Those areas presently being overused by livestock would continue to be overused and may be a factor limiting local wildlife populations.

However, as a result of increased human activity, (e.g., energy exploration and development) wildlife habitat in the ES area will be expected to be of a lower quality than at present. There will be less available forage and cover for most wildlife species. (The opportunity for most animals to move and migrate without harassment or barriers would be reduced.) Some habitats which are presently used will become unavailable due to human activity, reducing the present carrying capacities. Those species (e.g., nesting raptors) which are sensitive to human activity will be forced into other areas. Pronghorn populations will be expected to reach and be maintained at the Wyoming Game and Fish Department's 1980 management objectives.

Although many acres of habitat may not be altered from the present situation, the overall increase in human activity in the ES area will be expected to reduce available habitat, lowering its quality for wildlife use, resulting in fewer numbers of most species.

Aquatic Wildlife

Aquatic habitats will be of lower quality than the present situation on Crooks Creek. Increased human activity on Green Mountain will continue the present trend of increased sediment yields. Livestock concentration areas will continue to create poor stream morphology for a trout fishery. Water flows will be expected to be reduced due to an increased demand for water in the area. Thus, fish production on this drainage will also be expected to be reduced by 20%-50% by 1998.

Lost Soldier Creek will be improved over the present situation due to proposed HMP fencing of this drainage. The overall quality will be improved due to livestock exclusion. The animals using this riparian area will increase in numbers and diversity.

Wild Horses

Future Populations

Upon implementation of the draft horse plan, wild horse numbers in the ES area will be kept at a reduced level of between 66 and 135 head; i.e., the horse population will be periodically reduced by rounding up and removing wild horses to keep the population within the parameters of the draft Seven Lakes Herd Management Area Plan (HMAP).

Quality of the wild horses' environment and the enjoyment of wild horses by the public as a wild symbol would decrease, but this quality cannot be measured.

Future Habitat

Over the next two decades, apart from the proposed action of livestock grazing management, extensive mineral activity is expected to take place in the Seven Lakes ES area. This activity will significantly modify the habitat conditions for wild horses.

Although precise locations of future uranium and coal mines, or of future oil and gas wells and exploration activities are unknown, some 20,000 acres in the ES area could be disturbed by 1998. On some of the disturbed sites, increased numbers of plants such as locoweed *(Astragalus* spp.), which can be poisonous to horses, will occur. Forage production on the disturbed sites will generally be diminished. Reclamation efforts will not restore the natural vegetative diversity found in the Seven Lakes ES area.

The mines and drilling will permanently displace some horses from their natural concentration areas. The displacement of wild horses will be primarily caused by energy company development of new water supplies as well as the destruction of existing watering places. Extreme draw-downs of some existing wells are expected to result from the mining efforts.

Additional disruption of the wild horses will be expected due to the increased activity along existing roads. No doubt additional roads will also be built. Merely the sounds of heavy equipment will add some stress to the horses. Stress in other animal species has been solidly linked to lower reproductive rates and disease susceptibility.

More people will be in the Seven Lakes ES area due to energy related activity, and increased harassment, capture, and killing of the wild horses will occur. With all the energy development that is planned for the area, the wild horses will find themselves in a continually less wild and remote setting. The mining and other energy activity will present increased hazards to the wild horses. The traffic will be a major danger. Nevertheless, the Seven Lakes ES area should be able to provide for the needs of the 66 to 135 wild horses proposed by the herd management area plan through 1998.

CULTURAL RESOURCES

Within 20 years, cultural resources will receive from moderate to severe damage in localized areas as a result of continuing geologic erosion, trampling by livestock, vandalism, and off-road vehicle travel.

Severe surface and subsurface damage will occur to those cultural resources not identified by the surveys made prior to coal, gas, and oil development. Approximately 10,000 acres will be disturbed by such development prior to 1998.

It is assumed that 10,000 acres of uranium lode claims will be developed by 1998. The Crooks Creek Medicine Wheel, which is eligible for nomination to the National Register, exists in an intensive uranium exploratory area. The possibility of damage to this site because of test drilling, shallow pit exploration, or vehicular movement is high.

Disturbed acreage from all mineral resource development will total 20,000 acres by 1998.

VISUAL RESOURCES

By 1998, the visual resource management (VRM) class objectives will be subject to change. This change will be a product of more intensive mining and petroleum development, resulting in a significant change in the characteristic landscape (refer to Mineral Resources section). The disturbed area of approximately 20,000 acres will be reduced to a VRM Class V designation (Map 2-21).

The other multiple use activities which would be occurring in the area are considered more compatible with the resource base and would not be expected to create any changes in the present VRM classes.

RECREATION

The projected hunter use for the ES area by 1998 is shown on Table 2-42. The data were prepared by using projections from the Wyoming Game and Fish Strategic Plan and assuming the present percent of harvest for these species listed.

Fishing on Crooks Creek (based upon Wyoming Game and Fish methodology and the reduction projected in the Animals section) will support one angler per mile. The 5¼ miles of creek will therefore provide approximately 5 recreation days for fishing.

The total recreation days projected from present data will be 1,983 days annually. This is an increase of 118% over the present use.

WILDERNESS

Under provisions of the Federal Land Policy and Management Act of 1976 (P.L. 94-579) the lands in the Seven Lakes ES area will have been reviewed to determine their potential and suitability for preservation as wilderness by 1991. Recommendations to the President will have been made regarding such preservation after mineral surveys have been conducted in each of the areas, if any, which are identified in the inventory and analysis process.

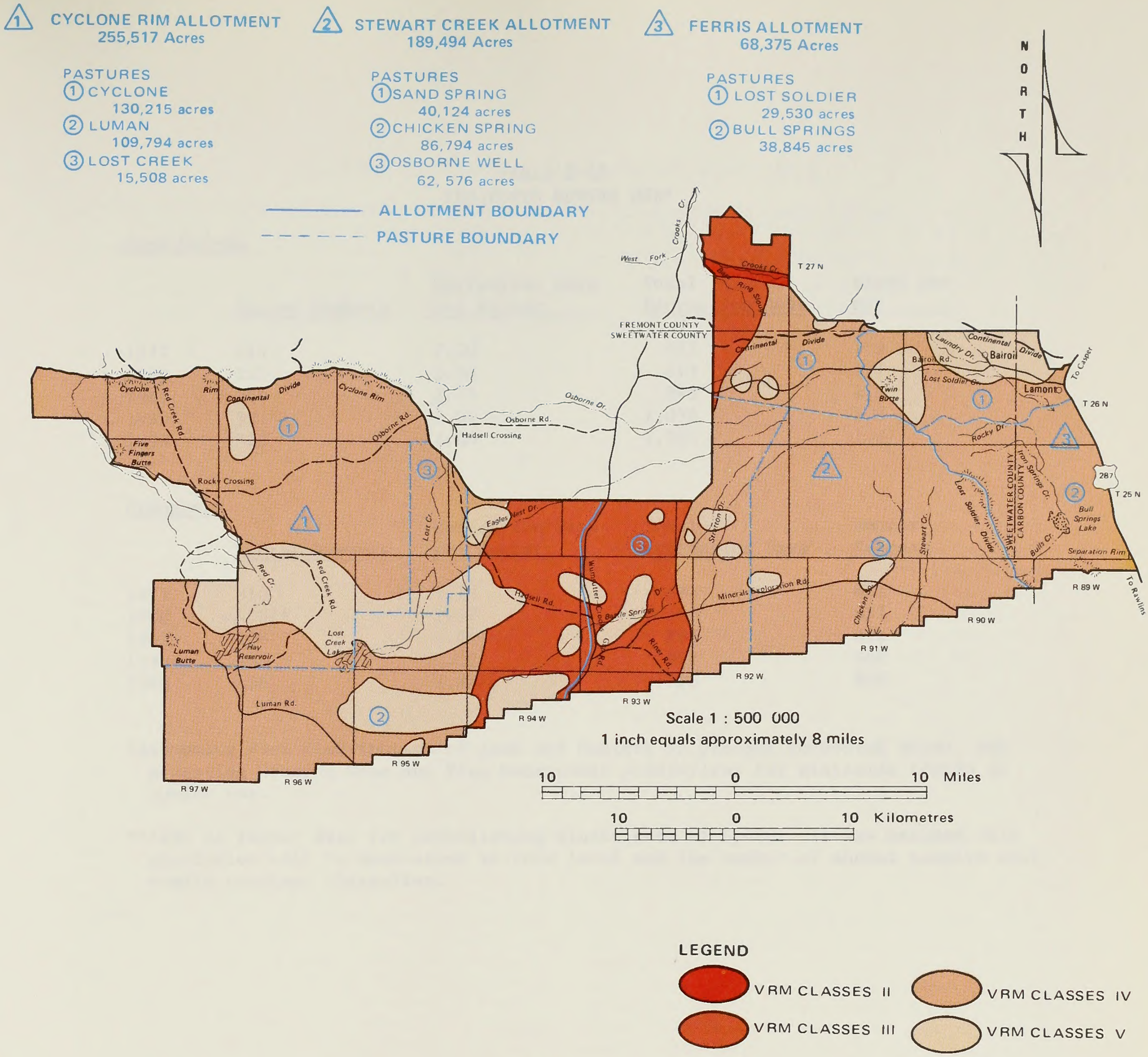
LIVESTOCK GRAZING

Within the next 20 years, the character of livestock grazing in the Seven Lakes ES area will be changed by coal and uranium mining. For example, one uranium company (Minerals Exploration Company) has proposed to dig a pit ½ mile wide by 4 miles long in the Stewart Creek allotment. In order to mine, they would pump the water table down, and discharge an average of 7,500 gallons of water per minute into Battle Springs Draw. In turn, the discharge would empty into Battle Springs Flat, in the Cyclone Rim allotment, inundating approximately 3,000 surface acres and drowning the existing vegetation which is mostly greasewood. A mining venture of this magnitude will eliminate the vegetation on 4,850 of acres and thus substantially reduce the forage production on two allotments. Seven similar mines are projected. Also, an additional 20,000 acres will be taken out of livestock production because of the mill sites, roads, and spoil piles associated with other mining ventures, although some may be reclaimed. Revegetation efforts following mining may have to rely on artificial irrigation methods in order to establish vegetation because the area has a short (100 days) growing season with slight (9 inches annually) and erratic precipitation. In addition to taking land out of production for livestock, mining may destroy existing and proposed water sources, but at the same time should provide some new sources.

Sheep use by the long term will remain the dominant use when compared to cattle use in the ES area because: (1) the forage of the Seven Lakes ES area is twice as well suited for sheep as for cattle; (2) sheep, especially winter sheep, do not require as many range improvements, such as water developments and fences, as do cattle; (3) sheep are more energy efficient (require the input of less fossil fuel, i.e., less trucking) than cattle, plus they produce wool and meat, not just meat (Cook, 1976; Cook, Christensen, and Visintainer 1976; Pimentel, Dritschilo, Krummel, and Kutzman 1975); and (4) the ES area will continue to serve as a winter range for sheep bands which summer in more alpine ranges in the region. Nevertheless, the tendency for some sheep operators to convert to cattle operations will continue.

By 1998, the contribution of large herbivores to the total ecosystem nutrient cycling will not be measurable (Charley 1977) despite the fact that on an annual basis an estimated 95% of the livestock leave the ES area, 30% of the pronghorn are removed through hunter harvesting, and 20% of the wild horses will be gathered.

Without implementation of the proposed action or one of the alternatives, few major range improvements for livestock management will be built in the ES area within the next 20 years. Gap-fencing to control livestock drift into the area from the north has been needed and discussed for many years. However, if the present depressed state of the livestock industry continues along



FUTURE VISUAL RESOURCE MANAGEMENT CLASSES BY 1998

Seven Lakes Grazing

Environmental Statement

Map 2 - 21

TABLE 2-42
PROJECTED HUNTER USE*

Sage Grouse

	Hunter Numbers	Recreation Days per Hunter	Total Recreation Days	Birds per Day
1977	219	2.20	482	1.9
1980	245	2.50	613	1.7
1985	350	2.75	963	1.1
1990	525	2.00	1,050	1.0
1998	525	2.00	1,050	1.0

Pronghorn

	Hunter Numbers	Recreation Days per Hunter	Total Recreation Days	Hunter Success
1977	310	1.72	533	86%
1980	408**	1.87	763	85%
1985	408	2.04	832	82%
1990	408	2.22	906	80%
1998	408	2.22	906	80%

*Assumming even distribution of game and hunters in present recording areas, and accepting Wyoming Game and Fish Department predictions for statewide trends in hunter use.

**1980 is target date for establishing winter herd of 5,000. It was assumed this population will be maintained at this level and the number of annual permits will remain constant thereafter.

with the general change in emphasis of public land management to multiple use from the livestock dominated use of the past, it is doubtful that any livestock fencing will be built.

MINERAL RESOURCES

Increased mineral activity in the energy-rich Great Divide Basin is a certainty. The ES area will show accelerated exploration for oil and gas, uranium, and coal.

Before estimates can be made as to the amount of mineral activity in the Seven Lakes ES area, certain general and specific assumptions must be made.

General assumptions are as follows:

1. There will be no mineral withdrawals.
2. Market prices will continue to rise to the world commodity prices.
3. Environmental restraints will be the same as today, but not more stringent.

Specific assumptions for oil and gas are as follows:

1. Interstate gas will continue to be regulated.
2. Oil and gas supportive activities can keep up with the drilling schedules, e.g., drill pipe supplies, rigs, log trucks, mud, mud logging units, and construction units.

Specific assumptions for coal are as follows:

1. Coal lease applications will be processed in a timely manner.
2. The needs for a labor force can be met.

Specific assumptions for uranium are as follows:

1. Uranium will remain a locatable mineral.
2. Nuclear energy will continue to be developed.
3. There will be major water problems; e.g., flooding or disposal.
4. There will be no access problems.

Oil and gas production in the ES area ranges from 60 year old fields to new discoveries. New technologies should help with secondary and tertiary recovery methods in existing and abandoned fields. With the advantage of equipment which would drill to greater depths and a higher monetary reward for finding oil and gas, new fields can be expected. The primary exploration area is presently in the southwestern part of the ES area, around Hay Reservoir.

For analysis purposes, it will be assumed that drilling activity will remain at its present average level (refer to Figure 2-6).

Vegetative disturbance due to oil and gas activity in the Seven Lakes ES area was calculated as follows:

Miles of seismic lines = 75 miles/year
Width = 10 feet
75% disturbance
Total acres disturbed by 1998 = 1,364 acres
Miles of roads to drill pads = 31 miles/year
Width = 10 feet
Total acres disturbed by 1998 = 2,255 acres
50% of roads will be reseeded = 1,127 acres
Drill pads = 31/year
4 acres/drill pad
Total acres disturbed by 1998 = 2,480 acres
Drill pads will be revegetated after 4 years if they are abandoned (Wyoming's drilling success ratio is 50%).
31 drill pads x 4 years x 4 acres/pad ÷ 2 = 248 acres successfully revegetated/year

Coal resources in the ES area will be developed through strip mining many of the shallow sub-bituminous coals and insitu-gasification of the numerous deep coals.

Insitu-gasification is a reality in central Wyoming with Energy Research and Development Administration's (ERDA) pilot plant, located near Hanna, Wyoming. According to Charles F. Brandenburg of ERDA's research station, Laramie, Wyoming, it was learned that a 1,000 megawatt power plant could be a reality in the ES area by 1989. The plant would disturb 4 sections of land during its lifetime, which would be 25 years. By 1998, 2 sections of land (1,280 acres) would be disturbed.

According to Rocky Mountain Energy, a subsidiary of Union Pacific Corporation, long range plans could include a surface gasification plant, which will also involve a strip mine. The strip mines in the area disturb about 200 acres per year. Although Rocky Mountain Energy is mainly interested in coals on the land grant lands south of the ES area which are controlled by Union Pacific Corporation, their interest in the Red Desert coals is an indication of industry's planning for future coal leasing.

The coals in the Wasatch Formation, which underlie the western portion of the ES area, are high in sulphur and contain uranium, to a small degree. These factors have made the coals unsuitable for mining. With advances in technology, the Red Desert coals could be suitable for mining in the future. As fast as new mining methods have been advancing, it is projected that two new coal strip mines will be opened in the ES area with a total disturbance, including spoil piles, railroads, tram roads, loadout facilities, and shops, of about 2,500 acres by 1998.

Sodium sulfate and sodium carbonate deposits which occur in the ES area will probably not be developed in the next 20 years, since most of the sodium sulfate-carbonate is used in the manufacture of pulp and paper, which would require high transportation costs.

Uranium development in the ES area will be quite extensive by 1998. Minerals Exploration Company has uranium lode claims on 58,000 acres of public lands in the ES area and has started development of some of their claims. The Minerals Exploration mine and mill will encompass 1,850 acres.

Since it is time consuming and costly to build a uranium mill, many companies will prefer to ship their ore to another company's mill. Seven companies have done extensive exploration for uranium in the ES area. None of the companies have applied for permits to mine their ore, or have applied for permits to build a mill, but it is assumed that many of these companies are waiting for the Minerals Exploration mill to open. With a mill in the immediate area, it could be economical to develop many of the known deposits.

Since uranium is a locatable mineral, mining companies seldom release information until they are ready to develop their resource. To give an exact figure on acres that will be disturbed in the next 20 years would be mere speculation, but in evaluating the amount of exploration that is presently going on, it is assumed that there could be about seven open pit uranium mines with a total disturbance of 10,000 acres by 1998.

In summary, there has been an increased interest in coal, uranium, and oil and gas. Some 20,000 acres could be disturbed due to mineral exploration and development.

TRANSPORTATION NETWORKS

Transportation

The system of roads in the Seven Lakes ES area after 1998 will be essentially the same as today in terms of the basic configuration. It is nearly certain that the Sweetwater County Road, which serves as access to Minerals Exploration Company's proposed mine site, will be paved with an asphalt surface (personal communication, Minerals Exploration Company June 1977). There is some possibility that the Bairoil Road will be paved, but that is entirely dependent on whether or not the known deposits of uranium west of Bairoil are mined. At any rate the Bairoil Road, the Wamsutter-Crooks Gap Road, and possibly the Luman and Red Creek Roads will receive increased levels of maintenance in the future over the present. Finally, future access in the winter should be better than at present because of the need to maintain roads year-round for access to mineral exploration and development sites.

In summary, the principal transportation network in the area will be essentially the same except that most primary roads will have been improved. New roads will be largely limited to access roads to mineral development sites. Overall, access will be upgraded so that vehicular travel will be possible for a greater part of the year to more types of vehicles, including those not specifically designed for operation on rough, unpaved roads.

SOCIOECONOMIC CONDITIONS

Seven Lakes ES Area Livestock Operators

If past trends are any indication of what may occur in the future, a number of assumptions can be made about the future of the livestock operations in the ES area. First, there should be fewer livestock operations than at present. Second, the livestock operations should be larger in overall size. Third, the trend in class of livestock is to convert from sheep to cattle. These three trends have been in effect since the 1930s (U.S. Department of Commerce, Census of Agriculture 1974); and if they continue, there should be fewer but larger livestock operations, most of which run cattle in the ES area.

Population

Population projections are available for the region. However, none is available which projects population beyond the year 1990. Based on the latest information, the total population in the region for the year 1990 is projected to be 163,863 (THK Associates 1976, Bickert, Brown, Coddington and Associates 1976, and personal communication, Fremont County Planning Office). The populations for the individual counties are projected to be 73,350 for Sweetwater; 47,801 for Fremont; and 40,712 for Carbon in 1990. Assuming that population will increase annually between 1990 and 1998 by the same amount as the average annual increase estimated in the above projections to occur between 1980 and 1990, the populations of the three county region will be 206,459 in 1998. This constitutes a 26% increase over the figure projected for 1990.

The proportion of total regional population dependent on the forage resources of the ES area will be much less than at present due to growth of mineral and other industries.

On the other hand, a much higher percentage of regional population will be dependent on mineral exploration and production in the future than at present. By 1998, Mineral Exporation Company, for example, may have been operating a uranium mine and mill for some 15 years. By virtue of the fact that a uranium mill will be located in the Seven Lakes ES area, other known uranium deposits may be developed by other companies (personal communication, Minerals Exploration Company June 1977). Should this situation develop, a large number of jobs will be created and thus a large number of people will be dependent on those resources for their livelihood. No projections of employment are available, however.

A similar situation exists in the oil industry. A major exploration program is underway in the vicinity of Hay Reservoir. Oil and gas is being produced in that area, and it is expected that this will continue for the foreseeable future. It is not known how many people are dependent on oil and gas exploration in the Seven Lakes ES area for their livelihood, nor is it known how long exploration and production in the area will continue.

Income

No estimates or projections of future income are known to exist for the Seven Lakes ES area. However, the following generalization can be offered with some certainty: First, agricultural income should be relatively unchanged from the present, both for the ES area and the region as a whole; second, income due to the exploration and production of minerals will increase proportionate to population and employment both for the ES area and for the region as a whole; finally, agriculture will be less important in the future relative to the overall economy than it is at the present time.

DESCRIPTION OF ENVIRONMENT—FUTURE

Employment

Agricultural employment will remain essentially the same in 1998 in the ES area under a continuation of the present situation. Employment by the mineral industries will increase by a very large amount due to continued uranium and oil and gas exploration and development. It is not possible to quantify future employment in the minerals industries, however.

Public Finance

No data are available for the future, but it can be assumed that livestock valuation will remain essentially unchanged (not considering inflation) and much lower as a percent of total regional assessed valuation.

Present mineral production and assessed valuation is confined to the Lost Soldier and Wertz oil fields at Bairoil. Oil and gas production in 1973 had an assessed valuation of more than $20 million. Future assessed valuation on mineral production will increase dramatically with oil and gas, uranium, and possibly coal development and production.

CHAPTER 3

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This chapter is an analysis of the significant impacts of the proposed action upon the various resources as they exist today (described in Chapter 2). Analyses indicate that there would be no significant impacts upon climate, air quality, topography, geology, paleontology, mineral resources, and land use plans, controls, and constraints.

Impacts are assessed at the short term and at the long term. The short term is 1986, the year by which all allotment management plans (AMPs) would have been fully implemented and each allotment would have gone through at least one full cycle of the proposed grazing system. The long term is 1998, the year by which all objectives of the proposed action should have been reached.

The proposed level of livestock grazing is compared throughout the impact analysis to the average active use level over the last 5 years as described in Chapters 1 and 2. The proposed action assumes that all licensed livestock use would be active; so it represents an increase in the active livestock use (i.e., nonuse would be eliminated). However, the proposed action also includes a reduction from present total licensed livestock use. The proposed level of livestock use is below the proper use level because allocation is made from the total properly usable forage for wild horses and wildlife. The remaining properly usable forage is proposed to be allocated to livestock.

ASSUMPTIONS AND ANALYSIS GUIDELINES

Some assumptions have necessarily been made in the analysis of impacts. The following are general assumptions. Assumptions specific to a given resource are presented with that resource section in this chapter.

1. Wildlife population management would continue through harvesting authorized by the Wyoming Game and Fish Department, and the maximum population levels would remain as they are in the Wyoming Game and Fish Department's Strategic Plan.
2. Wild horse numbers in the Seven Lakes ES area would be reduced in accordance with the draft Seven Lakes Herd Management Area Plan (HMAP), which would be implemented concurrently with the proposed action. The area would have a maximum of 135 horses, a minimum of 66 horses, and an average of 95 horses. The Ferris allotment would have a maximum of 21, minimum of 10, and an average of 15 horses. The Stewart Creek allotment would have a maximum of 57, minimum of 28, and an average of 40 horses. The Cyclone Rim allotment would have a maximum of 57, minimum of 28, and an average of 40 horses.
3. Range improvements would be completed on schedule (by year 5) and would be funded 70% by BLM and 30% out of range betterment funds.

Table 3-1 depicts the estimated number of surface acres that would be disturbed as a result of the construction and continued existence of the proposed range improvements.

IMPACTS ON SOILS

Erosion Potential and Sediment Yield

The Universal Soil Loss Equation and the Sediment Yield Factor Rating were used to determine changes in erosion rates and sediment yields which would occur following implementation of the proposed action. Anticipated changes were found to be so minimal that they could not be measured using the above methodology (see Appendix B-3-1 and B-2-18). A 2% increase (see Vegetation, Table 3-8) in vegetative cover on soils containing large amounts of sand and with relatively flat slopes (less than 5%) indicated little if any changes in erosion or sediment yield as a result of implementation of the proposed action.

Wind Erosion

The three main factors influencing wind erosion are soil conditions, rainfall, and vegetation (Hudson 1971). Soils in the area normally form a crust or seal which reduces the ability of the wind to remove and carry soil particles. When a soil surface is moist, it is not affected by wind erosion. Areas of low precipitation (less than 12 inches) are therefore more affected by wind erosion than areas with higher precipitation. Precipitation in most of the Seven Lakes ES area ranges from 7 to 9 inches (see Climate section). Vegetation, litter, and stone form a protective layer on the surface of the soil, reducing moisture loss by evaporation and slowing the velocity of the wind near the soil surface.

Therefore, implementation of the proposed action and the anticipated 2% increase in cover should reduce erosion by wind. However, the expected reduction would be partially offset, to an unknown extent, by livestock

TABLE 3-1
SURFACE ACRES DISTURBED AS A RESULT OF PROPOSED RANGE IMPROVEMENTS*

TYPE IMPROVEMENT	NUMBER	ACRES DISTURBED PER UNIT	TOTAL ACRES DISTURBED
Spring Development	1	2.0	2.0
Type 1 Fence (Allotment boundary)	16.3 mi.	1.5/mi.	24.5
Let-down Fence	27.8 mi.	1.5/mi.	41.7
Cattleguard	4	0	0
Water Well Development	35	1.8	63.0
Pasture Boundary Signs	64 mi.	.1/mi.	6.4
Reservoir Repair	1	4.0	4.0
Exclosure (Reservoirs Fenced)	4	.2 on fenceline .9 inside permanent exclosure .9 inside livestock watering area	.8 on fenceline 3.6 inside permanent exclosure 3.6 inside livestock watering area
Pipeline	12 mi.	.1/mi.	1.2
		TOTAL	150.8

*See Appendix B-3-5 for rationales.

breaking up the soil crust, which would increase the accessibility of soil particles to removal by wind.

Summary of Impacts

Because of generally good range conditions, dispersal of grazing use by additional waters, deferring livestock grazing use during the initial vegetation growing season and total grazing use at a level well below average annual growth (Appendix B-2-7) changes in erosion rates and sediment yields were found to be so minimal that they could not be measured. There would be a very small but unquantifiable short and long-term decrease of soil erosion by wind.

IMPACTS ON WATER RESOURCES

Impacts on Surface Water Supply

Grazing Systems

Conversions in livestock class and implementation of grazing systems would impact water use. In all allotments, livestock consumption of water would increase over the short term because of activation of nonuse in the proposed action, and then increase more over the long term because of the grazing systems (Table 3-2). The net impact on livestock water consumption in the ES area would be an increase from 14 to 27 acre-feet/year (ac ft/yr) in the short term and to 30 ac ft/yr in the long term. This increase would not decrease the supply of available water since wells would be developed to supply additional water. As shown in Table 3-2 the quantities of water used by livestock are small. The table also shows that wildlife consumption of water would remain the same, wild horse consumption would decrease by two-thirds, while livestock consumption would double; all by the long term.

Storm runoffs would be impacted because of the expected increase in vegetative cover caused by the grazing systems (see Vegetation Table 3-8). Storm runoff was calculated from at least one representative stream in each allotment. These streams only represent 84,000 acres of the ES area, and thus provide expected relative changes in runoff, not the total change for the entire ES area. To determine the storm runoffs, HYMO nomographs developed by Water Resources Research Institute (WRRI) (Smith 1976a) were used with hydrologic soil-cover complexes as the input. The hydrologic soil-cover complexes were determined by using infiltration and vegetative cover along with soils data. The runoff values are developed in Appendices B-3-1 and B-3-2. The present, short-term, and long-term 10-year storm runoff is presented in Table 3-3. Table 3-3 indicates that ten-year recurrence runoof for the ES area as a whole under the proposed action would decrease by 23 percent by the long term. Runoff would be reduced in all allotments except the Stewart Creek where intensity of use and vegetation increases could nearly balance out causing runoff to increase slightly at first and then begin to decrease.

Range Improvements

The decrease of storm runoff (Table 3-3) would be partially due to the water developments. The developments would draw livestock grazing out of the ephemeral and intermittent channels which are the areas where rainfall and snow are most likely to contribute to storm runoff (Hewlett and Nutter 1969). The decrease of runoff in these areas would be due to the lessened grazing intensity in the drainages, causing decreased soil compaction and thus increasing infiltration (Gifford and Hawkins n.d.).

The water developments would cause increased grazing in previously lightly grazed areas, thus increasing soil compaction and decreasing infiltration around the wells. However, this increased acreage of heavy grazing would be offset by the greater increase of area under light or moderate grazing (see Appendix B-3-8). Therefore, while total consumption of water by livestock, wildlife, and wild horses would increase both by the short and long term this would have no effect on surface water supply. Ten-year recurrence runoff by representative drainages would be decreased by 23% but while the effect would be to decrease water supply, it is felt that the decrease on total water supply would be insignificant.

Impacts on Surface Water Quality

Grazing Systems

Since grazing systems would cause a reduction of storm runoff, and sediment transport is dependent on stream power (Linsley, Kohler, and Paulhus 1975), total sediment yields would be expected to be reduced also over both the short and long term. The amount of reduction would be proportional to the decrease of storm runoff, but what the proportion might be is not known.

Salinity levels (total dissolved solids) are proportional to sediment levels in the Seven Lakes area as can be seen from USGS (1976); thus, the decrease in total sediment levels would cause a proportional decrease of total salinity levels in both the short and long term.

Range Improvements

The water developments would affect distributions of livestock and thus affect bacterial quality of the waters. Since no data exist on bacteriological pathogens in the waters of the ES area, it is not possible to predict the magnitude of change in these levels. Kunkle (1970) determined that coliform bacteria in streams came mainly from the area directly adjacent to streams, and that upland areas contributed very minor amounts. The water developments of the proposed action are expected to draw livestock concentrations from along the streams

TABLE 3-2
WATER CONSUMPTION AND LOSS FROM EVAPORATION

	Acre Feet of Water Per Year*		
	Present	Short Term	Long Term
Livestock Consumption:			
Ferris	2	2	2
Stewart Creek	2	8	9
Cyclone Rim	10	17	19
Total of Allotments	14	27	30
Wild Horse Consumption	3	1	1
Wildlife Consumption	1	1	1
Evaporative Losses** From Livestock Water Developments	69	75	75
Total Consumption	87	104	107

*Table 2-6
**Appendix B-3-3

TABLE 3-3

TEN-YEAR RECURRENCE RUNOFF BY REPRESENTATIVE DRAINAGES

Allotment and Representative Drainages	Acre-Feet Runoff		
	Present	Short Term	Long Term
Ferris (Lost Soldier Creek)	165	150	130
Stewart Creek (Stewart Creek)	35	40	35
(Spring Creek)	37	40	37
(Bulls Creek)	28	32	29
Cyclone Rim (Eagles Nest Draw)	80	35	35
Total of Representative Drainages	345	297	266

into the presently dry upland areas. Therefore, it would be expected that fecal contamination from livestock would decrease in waters of the area over both the short and long term.

The proportion of bacteriological pathogens contributed by livestock in comparison to such other sources as wildlife is not known; so it cannot be determined whether a decrease in livestock contributions would have an impact on the overall fecal contamination of the area.

It is concluded, therefore, that the overall effect of implementation of the proposed action would be to improve water quality in the Seven Lakes ES area. It is not possible however, to predict the amount of improvement.

Impacts on Ground Water Supply

Range Improvements

Due to the water developments, a greater amount of groundwater would be used by the end of the short term, but the small amounts—1 to 15 gallons per minute (gpm)—that would be pumped by proposed windmills for stock watering, usually only during the summer months, would only remove about 300 ac ft/yr in an area with a recharge rate of 20,000 ac ft/yr. Some of the produced water would percolate back into aquifers from overflow pits by seepage.

Groundwater quality would be improved by the spring improvement at Kinch-McKinney Springs. Fencing the spring would prevent contamination of the spring source by bacteriological pathogens in livestock feces.

The water made available by the water developments of the proposed action would be utilized by wildlife as well as livestock. With increased water, there would be a resultant increase in wildlife consumption from 1.47 to 1.48 ac ft/yr over the short term and use would remain at that level over the long term.

The improvement of one reservoir and construction of overflow pits at wells would increase the amount of stored water that would be lost to evaporation. The evaporation would be increased from 69 to 75 ac ft/yr by the end of the short term and would then remain constant through the long term. This increase in evaporation would not be appreciable enough to decrease water supplies.

Summary of Impacts

Water consumption and evaporation would be increased from 87 to 104 ac ft/yr in the short term and to 107 ac ft/yr in the long term because of the proposed action. Most of the increase would be due to increased livestock consumption (Table 3-2). This increase in water consumption and evaporation is insignificant given the potential water supply, particularly from groundwater, in the ES area. The sum of 107 ac ft/yr is approximately one-half of one percent of the annual recharge rate of 20,000 ac ft.

Ten-year recurrence storm runoffs would be expected to decrease in all allotments by an average of 23% by the end of the long term (Table 3-3). The average yearly storm runoffs could also decrease, but the decrease would not likely be measurable since HYMO shows no runoff for the 2-year recurrence storms. The total sediment and salinity content of runoffs would decline proportionately with the decline of runoffs in the allotments.

Bacteriological pathogens in streams in the ES area which are contributed by livestock would be reduced under the proposed action. This would occur because water developments would draw livestock away from the streams onto presently dry upland areas. Although the magnitude of the change cannot be predicted, the process of changing grazing patterns in the ES area would improve water quality.

The overproduction of water by wells could waste water and create erosion problems if capacities of overflow pits were exceeded. Design failures or large precipitation events could also cause erosion problems in and around the proposed range improvements.

The spring improvement at Kinch-McKinney Spring would protect and improve the water quality there. This improvement would occur in the short term and continue into the long term.

It can be concluded from the above analysis that the proposed action would have virtually no effect on water supply in the ES area either from ground or surface water. Water quality would be improved slightly in the streams in the ES area although the magnitude of the improvement cannot be estimated. There would be some risk of soil erosion in and around water developments due to excess water production, structure design failure, or a major precipitation event but this risk is believed to be very minor.

IMPACTS ON VEGETATION

This section will first discuss generalized principles of plant growth in relation to the impacts of the various grazing treatments, followed by summaries of short and long-term impacts by allotment for the proposed action. The vegetation section will conclude with a discussion of impacts on vegetation by range improvements and on threatened and endangered species.

Estimates of vegetative impacts due to the proposed action are based upon vegetative studies and professional judgment. Although the vegetative studies were not performed within the ES boundaries, they are believed to be applicable to the Seven Lakes ES area. It should be remembered, however, that the predicted impacts are the best estimates of what would happen and are not to be interpreted as certainties. The monitoring studies described in Chapter 1 are designed to reveal the actual vegetative impacts of the proposed action. If the desired results are not being achieved, then the allotment management plans (AMPs) would be revised as necessary.

Grazing Management

Impacts to vegetation caused by grazing vary according to the vegetative stage of growth or dormancy. Defoliation of plants during susceptible periods can reduce the ability of plants to maintain growth and vigor (Buwai and Trlica 1977). The time of defoliation is very important in determining the ability of the plant to recover. The most detrimental time of defoliation would be during active growth when carbohydrate reserves are being used to produce herbage. McCarty and Price (1942—from Stoddart, Smith, and Box 1975) identified two critical periods in the growth of forage grasses: (1) the period of active reproduction, from flower-stalk formation to and including seed ripening; and (2) the forepart of the normal carbohydrate-storage period.

Garrison (1972) stated that fall and winter seasons are the least detrimental periods for utilization of shrubs. Late spring and the middle of the growing season, when the carbohydrate reserves are the lowest, are the most damaging periods of use. Trlica and Cook (1971) found that most shrub species defoliated by clipping about May 10 or July 1, had significantly smaller food reserves by the fall season than did unclipped plants. Defoliation on approximately April 1 had less impact on food reserves than the May or July defoliation.

Each pasture in the ES area would receive a rest period from livestock grazing during portions of the growing period. Not grazing the vegetation during the growing period is very important to the plant in terms of the carbohydrate reserve levels. The carbohydrate reserves are used during periods of rapid herbage growth, such as initial growth, subsequent regrowth, and for respiration and slight growth during the winter (Cook 1966; Priestly 1962—from Coyne and Cook, 1970). Allowing growth without grazing pressure during portions of the growing period would allow the plant to have available, ample carbohydrate reserves for normal growth and development. Not grazing during portions of the growing season would allow an increase in vigor, production, seed production, and litter accumulation.

Livestock grazing occurs in all pastures (except Luman and Lost Creek) during the summer growing period (treatments A, B, and D). The seasonal grazing system in the Cyclone Rim allotment would result in sheep grazing from May 15 through July 15 each year in the Cyclone pasture. This summer sheep grazing has historically taken place near the Stratton Lakes on approximately one-third (43,000 acres) of the Cyclone pasture. The historical use would continue with the implementation of the proposed action. Concentration of the summer sheep use in one-third of the Cyclone pasture would result in the decline of the vegetative vigor, production, and litter accumulation in the areas of summer sheep use. The remaining portions of the Cyclone pasture (approximately 87,200 acres) would be expected to improve in production, litter accumulation, vigor, and seed production (Table 3-4).

Spring and summer grazing by livestock would also occur in the Lost Soldier and Bull Springs pastures in the Ferris allotment (treatments A and B). The turn out dates would alternate from May 15 one year to August 1 the next year. This would allow time in alternate years for normal plant growth to occur during the growing season before livestock grazing begins. From April 1 to May 15, the entire allotment would receive a rest from livestock grazing. Rest during this period of time is critical to the vegetation in order to begin growth (refer to Table 1-8). Coincident with the beginning of growth at the end of the dormant season, there is a decline in stored carbohydrates. The length of time during which stored foods are being deleted with the onset of growth may be as little as a few days in grasses (White 1973—from Stoddart, Smith, and Box 1975) or as much as months in some desert shrubs (Coyne and Cook 1970). The period ends when food manufactured by the newly formed leaves exceeds the needs for metabolism and growth (Stoddart, Smith, and Box 1975). If grazing took place during this time, the growth of the new leaves would be disrupted and would cause a delay in the replenishment of the food reserves.

Grazing during the growing season is considered detrimental to the vegetation by removal of portions of the plant necessary in the synthesis of carbohydrates and by forcing the plant to deplete its carbohydrate reserves by regrowth. Not allowing livestock to graze the pasture the same time each year would allow the vegetation to recover.

The entire Stewart Creek allotment would receive a rest from livestock grazing from April 1 to May 19 to allow for growth of the vegetation. The absence of grazing would allow production of new leaves which are vital in replenishing the depleted food reserves.

Early summer cattle grazing (from May 20 to August 1) would occur in two pastures within the allotment (treatment D) while the third pasture would be deferred (treatment B) until August 1. The entire allotment would be grazed from August 1 to October 31. This grazing system allows each pasture to be deferred for 2½ months of the growing season every third year (treatment B). The deferment is important to the vegetation in order to allow the plants an entire growing season without grazing pressure, to improve vigor, seed production, and litter accumulation.

Grazing during the fall, winter (treatments C, E, and G), or dormant season is considered to be the least detrimental to the vegetation. Cook and Stoddart (1963) concluded that desert ranges are best adapted to winter grazing. Although there would be plant mortality and loss of crown cover (Cook and Stoddart 1963), the loss is expected to be less than the plant's yearly growth.

Despite some short-term detrimental effects due to periodic grazing during the growing season (i.e., 2 of every 3 years in the Stewart Creek allotment), the overall effect of the total grazing systems upon vegetation would more than offset these short-term impacts because: (1) the current vegetation condition across the area is excellent or good to begin with, (2) grazing use would be deferred during the initial vegetation growing season, (3) the level of grazing use would be dispersed to areas which are presently receiving only light use, and (4) grazing would be kept at a level well below average annual growth.

TABLE 3-4
PREDICTED SHORT-TERM IMPACTS ON VEGETATION

Allotment Name	Grazing System	Short-term Impacts of Grazing Treatment
Ferris (68,345 acres)	Two-pasture deferred-rotation system with season-long winter sheep grazing-three treatments.	
	Treatment A: Graze from May 15 until seedripe of key species (August 1), then rest until winter grazing (November 1).	Graze: Vigor, seed production, litter accumulation reduced. Rest: Vigor and litter accumulation increased. Some seedling establishment.
	Treatment B: Rest until seedripe of key species (August 1), then graze to trample seed into soil until October 31.	Rest: Vigor, seed production increased. Litter accumulation increased. Seedling establishment increased. Graze: Vigor, litter accumulation reduced. Trampling of seed increased.
	Treatment C: Graze season-long through the winter (November 1-March 31).	Vigor, litter accumulation reduced.
Stewart Creek (188,991 acres)	Three-pasture deferred-rotation grazing system with season-long winter sheep grazing in two pastures. Three treatments.	
	Treatment B: Rest until seedripe of key species (August 1), then graze to trample seed into soil until October 31.	Rest: Vigor, seed production, litter accumulation, seedling establishment increased. Graze: Vigor, litter accumulation reduced. Trampling of seeds.
	Treatment C: Graze season-long through the winter (November 1-March 31).	Vigor and litter accumulation reduced.
	Treatment D: Graze season-long through the summer (May 20-October 31).	Vigor, litter accumulation, seed production reduced.

TABLE 3-4 (CONTINUED)
PREDICTED SHORT-TERM IMPACTS ON VEGETATION

Allotment Name	Grazing System	Short-term Impacts of Grazing Treatments
Cyclone Rim (255,518 acres)	Three pasture seasonal grazing system. Four treatments.	
	Treatment A: Graze from May 15 until seedripe of key species (August 1), then rest until winter grazing (November 1).	Graze: Vigor, seed production, litter accumulation reduced. Rest: Vigor, litter accumulation increased. Some seedling establishment.
	Treatment E: Graze October 1 through January 15. Rest from August 15 through October 1.	Graze: Vigor and litter accumulation reduced. Rest: Vigor, litter accumulation, seedling establishment increased.
	Treatment F: Rest yearlong.	Rest: Vigor, litter accumulation, seedling establishment, seed production increased.
	Treatment G: Graze December 15 to March 31. Rest from April 1 to December 15.	Graze: Vigor and litter accumulation reduced. Rest: Vigor, seed production, seedling establishment, litter accumulation increased.

Table 3-5 compares long-term vegetative composition with present composition by allotment. Table 3-6 shows that the estimated long-term production (64,707 winter sheep AUMs) is 7% greater than the present production (60,620 winter sheep AUMs) and is within the maximum potential for the area. Table 3-7 identifies the expected range condition by pasture in 1998. In determining the predicted range condition, the grazing system, the treatment, and present range condition were considered (refer to Appendix B-3-10 for methodology in determining predicted range conditions). As shown by the table it is estimated that 15% of the ES acres will improve at least one condition class as a result of the proposed action.

The long-term impacts of the two pasture (Ferris allotment) and three pasture (Stewart Creek allotment) deferred-rotation grazing systems would be expected to be: increased vegetative production due to the increased seedling establishment, improved vigor, increased litter accumulation, and increased percentage composition of grass and forb key species.

A study by Gibbens and Fisser (1975) in the Red Desert region (in which the Seven Lakes ES area is also located), on a two-pasture deferred-rotation grazing system, found that plant composition, calculated as a percentage by species of the total vegetative cover, would show a relative increase in the grasses and forbs.

In this same study, a two-pasture deferred grazing system showed an increase in grass cover of 31% outside of a control, while the grass cover increase from 1967 to 1971 inside the control was 25%. Therefore, the net increase of grass cover from 1967 to 1971 of 6% was a result of the two-pasture deferred grazing system. Shrub cover change from 1967 to 1971 outside the exclosure was a decrease of 11%, while inside the exclosure was an increase of 34%. These results indicate that a two-pasture deferred grazing system should cause a reduction of shrub cover when compared to the absence of grazing. It is estimated that the two and three-pasture deferred-rotation grazing systems in the Seven Lakes ES area would decrease shrub cover 10%. Forbs showed a decrease in cover both inside and outside of the exclosure, but the greatest decrease was inside the exclosure. Over the entire ES area the increase in cover is estimated at 2% (refer to Table 3-8).

The proposed three-pasture seasonal grazing system in the Cyclone Rim allotment is expected to have these long-term impacts: improved vigor of vegetation species, increased litter accumulation, increased seed production and seedling establishment, and increased production.

Grazing in the Cyclone Rim allotment would take place during the summer and winter months (refer to Table 1-4). As previously shown, the winter grazing season, which would receive the majority (94%) of the livestock grazing use, is least detrimental to the vegetation (Garrison 1972). The adverse impacts such as decreased litter and seedling establishment created by grazing from May 1 through July 15 in the Cyclone pasture would be detrimental in the area of the summer sheep use.

The incorporation of the Lost Creek pasture and the Luman pasture following completion of one grazing cycle would allow the Lost Creek pasture to be grazed from December 15 to March 31. Winter is considered to be the least detrimental period of utilization for shrubs (Garrison 1972). The lack of grazing pressure during the growing period would allow the vegetation to improve in terms of vigor, seed production, seedling establishment, and litter accumulation.

The increase in grazing pressure by livestock during the winter (no increase would be expected from wildlife or wild horses) would not be detrimental to the vegetation resource over the long term.

The Lost Creek drainage would be expected to improve in condition and production over the long term as a result of the control of unauthorized drift. Over the entire Luman pasture (after incorporation of Lost Creek pasture has taken place), the production and condition would be expected to improve slightly (refer to Table 3-6 and Table 3-7, respectively) due to the distribution of livestock, wildlife, and wild horses by water developments. As mentioned previously, the winter season is considered to be the least detrimental to the vegetation in terms of grazing. The lack of livestock grazing during the spring and summer months would replenish any reserve levels depleted during the winter months. (During the summer months, grazing pressure by wildlife and wild horses in the Luman and Lost Creek pastures is very light; therefore, they would not significantly affect the vegetation.)

Concentration of livestock, wildlife, and wild horses in areas offering shelter during winter storms is not considered detrimental to the vegetation in the long term, because there are numerous locations offering protection throughout the Luman and Lost Creek pastures, and the lack of grazing during the summer months would allow the vegetation to recuperate from the depletion of carbohydrate reserve levels from winter grazing. Long-term increases in production over the ES area of 4,087 winter sheep AUMs would be expected from the proposed action.

The inadequate allocation of competitive forage for wild horses (an additional 499 AUMs is needed to satisfy the forage requirements for the ES area—refer to Appendix B-3-6 and Wild Horse section, Chapter 3) would result in slight overgrazing (499 AUMs in an area producing approximately 14,750 AUMs) of the vegetation within the approximately 118,000 acre wild horse concentration areas. (refer to Map 2-17).

The overgrazing would not be considered detrimental to the vegetation in the long term, because the improvement due to the proposed action would allow the vegetation to recuperate from this overgrazing and still increase in production.

Range Improvements

Construction of range improvements would remove 150.8 acres from production. (Table 1-11 lists the range improvements by allotment; Table 3-1 lists the total acres disturbed by each type of range improvement and the total acres disturbed.) The range improvements disturbing the major proportion of the acres would be the let-

TABLE 3-5
ESTIMATED FUTURE VEGETATIVE COMPOSITION AT LONG TERM (1998) ON PUBLIC, STATE, AND PRIVATE LAND UNDER THE PROPOSED ACTION COMPARED WITH PRESENT COMPOSITION

Allotments & Vegetation Types	Present Key Species Composition* (% By Weight)				Future Key Species Composition (%)**			
Ferris	Agda	Orhy	Pose	Artr	Agda	Orhy	Pose	Artr
Sagebrush	16	2	2	29	19	5	5	28
Grass	20	5	2	16	23	8	5	12
Greasewood	10	8	2	T	10	8	2	T
Stewart Creek	Agda	Artr	Orhy	Stco	Agda	Artr	Orhy	Stco
Sagebrush	8	31	4	10	8	30	4	10
Grass	15	9	2	3	15	7	2	3
Cyclone Rim	Atnu	Cela	Artr	Agsp	Atnu	Cela	Artr	Agsp
Sagebrush	7	3	19	12	10	5	19	10
Grass	7	1	11	1	10	T	10	T
Saltbush	38	1	5	0	40	T	5	T
Greasewood	28	T	2	T	28	T	2	T

*"T" = Trace. Refer to Appendix B-3-4 for methodology in determining present key species composition.

Agsp	Agropyron spicatum	Bluebunch wheatgrass
Agda	Agropyron dasystachyum	Thickspike wheatgrass
Orhy	Oryzopsis hymenoides	Indian ricegrass
Pose	Poa secunda	Sandberg bluegrass
Artr	Artemisia tridentata	Big sagebrush
Stco	Stipa comata	Needle-and-thread
Atnu	Atriplex nuttallii	Nuttall saltbush
Cela	Ceritoides lanata	Winterfat

**Refer to Appendix B-3-9 for methodology in determining future key species composition percentage.

TABLE 3-6
FORAGE PRODUCTION

Allotment	Present Total Production of Vegetation Pounds*	Present Production of Forage in Terms of Properly Usable Winter Sheep AUMs/Pounds	Long Term (1998) Production of Forage in Terms of Properly Usable Winter Sheep AUMs/Pounds***	Maximum Potential Production of Forage in Terms of Properly Usable and Suitable Winter Sheep AUMs**/Pounds
Ferris (68,345 acres)	11,335,146	5,625/2,531,250	6,314/2,841,300	12,766/5,744,700
Stewart Creek (188,991 acres)	31,958,032	19,710/8,869,500	21,704/9,766,800	38,887/17,499,150
Cyclone Rim (255,518 acres)	57,171,853	35,285/15,878,250	36,689/16,510,050	46,804/21,061,800
Totals	100,465,031	60,620/27,279,000	64,707/29,118,150	98,457/44,305,650

*From 1975-76 weight estimate survey

**From U.S.D.A. Soil Conservation Service method described in National Range Handbook

***Long-term production was determined by adding potential production (AUMs) with management (from the suitability analyses) to the potentially suitable AUMs that are presently unsuitable due to lack of water and low production (also from suitability analyses). The long-term production levels will adequately meet the proposed use levels in each allotment (Table 1-3) but will not meet the AMP objectives (Table 1-5).

TABLE 3-7
PRESENT AND PREDICTED FUTURE RANGE CONDITION IN ACRES BY ALLOTMENT AND PASTURE IN 1976 AND 1998*

Allotment and Pasture	Present Range Condition**				Future Range Condition			
	Poor	Fair	Good	Excellent	Poor	Fair	Good	Excellent
Ferris								
Lost Soldier	1,007	12,818	14,032	488	755	9,865	13,729	3,996
Bull Springs	1,379	21,148	14,337	774	1,034	16,206	16,040	4,358
Stewart Creek								
Osborne Well	199	7,922	54,416	0	149	5,991	42,793	13,604
Sand Springs	1,612	9,885	24,189	3,812	1,209	7,817	20,613	9,859
Chicken Springs	108	16,611	68,925	1,115	81	12,485	55,847	18,346
Cyclone Rim								
Cyclone	0	10,592	99,462	18,586	530	7,944	81,688	38,478
Luman	0	14,927	71,444	22,367	0	12,688	62,966	33,084
Lost Creek	0	2,393	10,907	2,208	0	1,675	8,353	5,480
ES Total***	4,305	96,296	357,712	49,350	3,758	74,671	302,029	127,205

*Refer to Appendix B-3-10 for methodology in determining future range condition.

**The acreage in each condition class by allotment by vegetative type is located in the back-up material.

Range condition class	Percentage of present plant community that is climax for the range site
Excellent	76-100
Good	51-75
Fair	26-50
Poor	0-25

Refer to Appendix B-2-10 for methodology in determining condition classes.

***The acreage by condition class does not total the ES area total acreage because field write-ups were not completed for several waste areas and, therefore, the condition could not be determined on those areas.

TABLE 3-8
VEGETATION COVER, BARE GROUND, AND LITTER AT THE PRESENT, SHORT, AND LONG-TERM TIME PERIODS

Allotment	1976	1986	1998
Ferris			
Live Vegetative Cover	18%	19%	20%
Bare Ground*	47%	46%	45%
Litter**	4%	5%	6%
Stewart Creek			
Live Vegetative Cover	25%	26%	27%
Bare Ground	57%	56%	55%
Litter	4%	5%	6%
Cyclone Rim			
Live Vegetative Cover	27%	28%	29%
Bare Ground	44%	43%	42%
Litter	4%	5%	6%

*Assumption: If the vegetative cover increases by 1%, the bare ground would decrease by 1%.

**Litter is assumed to change at the same rate as the live vegetative cover.

down fences (41.7 acres) and the Type 1 fences (24.5 acres).

Even though fences are beneficial in the management of livestock, they do cause trailing of livestock, wildlife, and wild horses along the fences. This would result in the deterioration of the vigor of the plants due to overgrazing and trampling. Use of motorized vehicles for maintenance would also lead to a reduction in vigor of vegetation. Another impact of the trailing of livestock and wildlife along the fence would be the removal of vegetation through trampling and compaction of the soil. This would cause adverse growing conditions.

A change in composition of the vegetative species could occur in the immediate vicinity of the fence. Overgrazing would cause a decrease in the preferred species and an increase in the less preferred species.

Impacts created through the development of a spring would include removal of vegetation, changes in composition, and decrease in vigor of plants. Use of the development by livestock would result in removal of vegetation immediately around the water trough. This area, a circle roughly 50 yards in radius, is commonly called a "sacrifice area." "Sacrifice areas" would be located at the spring and each of the 35 water wells. Total disturbed area would be 2 acres for the spring development and 1.8 acres per water well development (Table 3-1). The vegetation would be removed mainly by trampling and somewhat by consumption by livestock and wildlife. These areas would be mostly devoid of vegetation and would remain in that poor condition due to the continual use of the water trough. It is believed that there would be a decrease in the vigor of the vegetative species immediately surrounding the "sacrifice area." The vigor decrease would come about from the dust on the plants, the partial trampling of vegetation by livestock, and the heavy grazing which commonly takes place around water sources.

The development of the water wells would improve the distribution of livestock over the entire ES area, thus promoting a more even utilization of the forage. Proper utilization of the forage is important in maintaining or improving the vegetative vigor, production, or range condition. The properly placed water developments, combined with the grazing systems, would "pull" the livestock from the overused existing water sources such as Lost Creek allowing these areas to improve in vigor and production.

Too-intense grazing is marked by a disappearance of the preferred plants or of those physiologically less resistant to grazing. Less preferred or more resistant plants may survive and replace the removed plants (Stoddart, Smith, and Box 1975). This would eventually lead to a change in composition. Continued grazing would cause an influx of species, which are not part of the climax, called "invaders." The invaders would be mobile annuals, but later, the invasion of herbaceous or woody perennials of low value would take place (Stoddart, Smith, and Box 1975).

Any place which has the existing vegetation removed provides an opportunity for other plants to begin growth. The construction, maintenance, and use of the various proposed projects may cause enough disturbance to permit increased numbers of poisonous plants to invade the site. For example, halogeton *(Halogeton glomeratus)* is a poisonous annual often found on disturbed sites. The amount of damage and utilization inflicted upon the vegetation would decrease as the distance from the water trough increased.

Areas which are considered favored as sheep bed grounds would be expected to receive excessive grazing pressure. The proposed action requires the operator to move the sheep bed grounds 1.5 miles every week except in the Cyclone Rim allotment where 3 miles is required. The proposed action does not restrict another operator from occupying the sheep bed ground just vacated. The areas which have been historically favored bed grounds, such as areas near water or which offer protection from adverse weather, would have the vegetation completely removed or damaged so severely that recuperation would be impossible. An area of approximately 1 to 3 acres would be expected to be impacted.

Threatened or Endangered Species

The proposed action would probably not affect the three threatened or endangered plant species *(Lesquerella macrocarpa*, Physaria *condensata*, and *Townsendia spathulata)* which are thought to have a good possibility of occurring within the ES area. These species have been located outside the ES area where they appear to be unpalatable and exhibit no evidence of grazing use. They could be damaged by trampling, however, if livestock concentrations (resulting from water developments, salting, bed grounds, etc.) were to occur in their habitats, but this is considered unlikely because *Lesquerella macrocarpa* is found on almost barren clay flats and the remaining two species are found on calcareous ridges. These sites produce very little usable forage and probably would not be used as a salt, bedding, or water location (personal communication, Robert Dorn 1978).

Summary

Short-term detrimental impacts under summer grazing (treatments A and D) would be reductions in vigor, litter accumulation, and seed production. Short-term detrimental impacts from fall and winter grazing (treatments B, C, E, and G) would be reductions in vigor and litter accumulation. The rest yearlong (treatment F) treatment would increase vigor, litter accumulation, seedling establishment, and seed production. Rest periods, which comprise part of treatments A and B, would enhance the vegetation by increasing vigor, seed production, and litter accumulation of the vegetation. The short-term impacts, such as increased vigor and seedling establishment, which would benefit the vegetation are considered prevalent over those which would be detrimental.

Within the Ferris and Stewart Creek allotments, the upland (away from present livestock water sources) areas would receive more grazing pressure due to proper distribution of livestock through range improvements. The proper distribution, combined with the grazing systems, would result in the vegetation of the upland areas improving in vigor, production, seed production, and litter accumulation. The bottomland (adjacent to existing waters) areas within the Ferris and Stewart Creek allotments would improve slightly in vigor and condition due to a lessening of the grazing pressure.

The upland and bottomland areas within the Cyclone Rim allotment would improve in vigor, production, seedling establishment, seed production, and litter accumulation due to the lack of grazing during the growing period.

From implementation of the proposed action, an increase of 4,087 winter sheep AUMs is expected. Also, by 1998 it is expected that there would be 547 fewer acres in poor condition; 21,625 fewer acres in fair condition; 55,683 fewer acres in good condition; and 77,855 acres more in excellent range condition classes (Table 3-7).

Analysis of Table 3-6, which depicts long-term production (by 1998), shows that the AMP objectives (Table 1-6) in terms of forage production would not be achieved in the Ferris and Cyclone Rim allotments; however, predicted production would adequately meet the proposed use levels (Table 1-4). The proposed action would achieve 6,314 winter sheep AUMs in the Ferris allotment while the AMP objective is 6,510 winter sheep AUMs. The Cyclone Rim AMP objective is 43,374 winter sheep AUMs while the proposed action would achieve 36,689 winter sheep AUMs. The Stewart Creek AMP forage production objective is 20,923 winter sheep AUMs and the expected long-term forage production is 21,704 winter sheep AUMs.

Construction of range improvements would cause the loss of 150.8 acres from production. Major impacts to the vegetation would be the removal of vegetation in the vicinity of the water troughs and the decrease in vigor of the vegetation through trampling and heavy grazing by livestock and wildlife along fences.

Overall, the aggregate impacts upon vegetation of implementing the proposed action are: (1) an increase in the percent composition of those vegetative species that are more desirable forage for livestock and wildlife (i.e., grasses, forbs, saltbush, and winterfat would increase relative to big sagebrush); (2) an increase in forage production form 60,620 AUMs to 64,707 AUMs by 1998; (3) an improvement of at least one condition class (from poor to fair, fair to good, good to excellent) on 15 percent of the acreage in the ES area; and (4) an increase of two percent in live vegetative cover.

IMPACTS ON ANIMALS

Terrestrial Wildlife

Wildlife populations are dependent on various environmental factors which allow the numbers of individuals in an area to fluctuate within the limits of available resources or carrying capacities. Such environmental factors include, but are not limited to food, water, cover (escape, loafing, nesting-fawning, etc.), weather, space, disease, social interactions, and predation. As any or all of these factors change, so would wildlife populations change within the most limiting of these factors. Therefore, changes of these limiting environmental factors due to the proposed action would provide an opportunity for wildlife populations to increase or decrease, but the realized effect on wildlife numbers would be the result of all environmental parameters.

The Seven Lakes ES area is not a closed wildlife habitat area. Many of the animals only seasonally inhabit the ES area. Therefore, the proposed action may affect only a portion of an animal's life cycle, and the limiting factors for a wildlife population may be outside this geographic area. In such cases, the proposed action may, again, provide an opportunity for population changes, but the limiting factor is beyond the influence of the ES area. Thus, population levels may not be altered by the proposed action.

Forage Allocations

The proposed forage allocations for wildlife are presented in Table 3-9. The total allocation would be 3,434 winter sheep AUMs; 725 AUMs in the Ferris, 956 AUMs in the Stewart Creek, and 1,753 AUMs in the Cyclone Rim allotment. The AUMs needed to support 5,000 winter and 1,339 summer pronghorn, and 175 yearlong mule deer are 1,325 winter sheep AUMs. Thus, there would be an additional 2,109 AUMs for these and other wildlife species. The excess would be 446 AUMs in the Ferris; 433 in the Stewart Creek; and 1,230 in the Cyclone Rim allotment (Table 3-9). These AUMs would be available to meet some of the requirements of the numerous other wildlife species (including sage grouse, waterfowl, small game, and nongame).

The distribution of these AUMs is based on the number of pronghorn and mule deer within the three allotments. Both summer and winter distributions were considered. However, there are inadequate data on the distributions of both pronghorn and mule deer during the many different weather and seasonal conditions. Although there are data on migrational movements between seasonal ranges (Wyoming Game and Fish Department), data on the within range movements of animals are generally lacking. Because of this, and because of broad annual variations in weather, it is not possible to predict where the animals will be found, and reserve the forage for these locations. The reserved AUMs are distributed over the total allotments instead of being placed on the designated crucial winter ranges or other seasonal concentration areas. The "excess" AUMs should help relieve stress due to winter competition between the livestock and big game species, and allow for more available forage for food selection.

These 3,434 AUMs would be 2,441 fewer than the present allocation of 5,875 AUMs (adjusted by the 1975-1976 range survey). This represents a 42% reduction in AUMs from the present situation. In addition, the 33,688 winter sheep AUMs in nonuse (Table 2-18) presently

TABLE 3-9

FORAGE ALLOCATION FOR WILDLIFE

Allotment	Allocated AUMs	Needed AUMs for Big Game	AUMs Available for Other Wildlife
Ferris	725	279	446
Stewart Creek	956	523	433
Cyclone Rim	1,753	523	1,230
Total	3,434	1,325	2,109

available to wildlife would be consumed by livestock under the proposed action. This represents about 56% of the total livestock forage production (60,620 AUMs from Table 2-15) in the ES area. This would mean a reduction in available forage and cover which wildlife could presently use in the ES area.

This reduction in available forage and cover for wildlife would mean a loss of habitat quality for some of the wildlife in the ES area. Those animals which are presently partially supported by these 33,688 nonuse and 2,441 allocated AUMs (e.g., nongame and small game species) would have to relocate to areas where adequate food and cover are available or succumb to starvation and increased predation as these AUMs are consumed by livestock. The availablity of forage and cover would also be reduced as the forage would be consumed by livestock. This loss of available forage would reduce the free choice of wildlife diets, causing some shifts in distributions and forage consumption. During the winter periods of limited forage, this may increase stress and contribute to the mortality of some animals. The present potential pronghorn carrying capacity, which vastly exceeds present populations, would be reduced as livestock use is increased to the proposed levels. However, the available forage should be sufficient to maintain present populations and meet the population objectives established for the area.

Pronghorn

Grazing Systems. The proposed grazing systems can be expected to impact the Seven Lakes pronghorn primarily through the predicted vegetative changes. Competitive forage allocations have been made for wildlife in the ES area. In spite of this fact, some forage competition would occur particularly during severe snowstorms.

Ferris Allotment. The proposed grazing system for the Ferris allotment is expected to maintain or improve the present winter habitat condition (Table 2-24) through the long-term period. Although the sagebrush overstories are projected to decrease in overall composition by 1% in the sagebrush types and 4% in the grass types (Table 3-5), winter forage would be adequate to support the area pronghorn since the changes in the sagebrush types (the most important types) are minor and the grass types are not extensively used by pronghorn (Taylor 1971). In addition, the increased production of the key grass species would improve forage selection for pronghorn use. Thus, the carrying capacity of the winter forage should remain at present levels on the 56,176 acre crucial pronghorn winter range. However, the projected 10% reduction in the browse cover (refer to Vegetation Section) would lower 2,771 acres from good to fair and 372 acres from a fair to poor condition class in this allotment. Spring and summer habitat condition would improve over the whole allotment from the projected increased production in the grass-forb layer. Approximately 5,223 acres would improve from poor to fair vegetative condition, although no acres would improve from fair to good vegetative condition. Some 63,122 acres would remain in their present condition class. This improvement of spring-summer habitat would provide a better selection of grasses and forbs for does during gestation and lactation. The increased abundance of these plants on both the broad types and meadow areas should improve long-term fawn production. However, research has not been conclusive to substantiate this increase in pronghorn production.

The increased winter sheep use of 800 head under the proposed action would have the greatest effect on the wintering pronghorn in this allotment. The presence of the herder, camp tenders, and dogs could force pronghorn to vacate a preferred area (Severson 1966). This spatial competition, or "interference", could result in voluntary withdrawal from available habitat and confinement of the population to smaller or less favorable areas.

During the winter, the diet overlap between the pronghorn and the sheep would increase to abnormal levels. Taylor (1975) found this to occur during a severe storm in 1971, "Competition was direct and could be serious". He found that during mild winters, pronghorn and sheep were dispersed over a wide area and they were able to move about and feed with no apparent conflict. However, food competition was aggravated by similar distribution patterns during severe weather. Such conditions may result in a loss of wintering pronghorn on 56,176 acres in the Ferris allotment, but research is lacking to quantify the extent of such losses. This increased sheep use and competition would reduce the present pronghorn forage beginning at full active use (1983). This could increase pronghorn stress and resultant mortality as forage becomes less available. However, population objectives would be met with the allocated forage.

Stewart Creek Allotment. Pronghorn summer habitat would show a long-term improvement on those areas which are presently being overused by livestock (i.e., the meadow areas on Crooks Creek, Stewart Creek, and other low-lying mesic areas). These areas which produce high quality grass and forb forage would provide additional nutrients for pronghorn use during the spring season. This should improve the long-term fawn production and animal vigor, but as explained for the Ferris, research has not substantiated this.

The projected increase in grass and forb production in this allotment would improve 46,560 acres of fawning habitat. Again, fawn production is expected to improve by the long term, but by an unquantifiable amount. Considering a 5% increase of production in the grass and forb layer, 1,922 acres of spring-summer habitat would improve from a fair to good, while 10,980 acres would improve from a poor to fair vegetative condition for pronghorn spring-summer use.

Winter carrying capacities would remain at or near their present levels even though there are projected decreases in sagebrush composition, since the changes in the sagebrush types are believed to be minor and the grass types are not extensively used (Taylor 1971) by pronghorn. Of the 24,987 acres of crucial pronghorn winter habitat, 17,435 acres would be expected to remain in their present condition classes, while 7,552 acres would change from fair to poor. However, the area would adequately support that portion of the Chain

Lakes herd wintering in this allotment, since the vegetative changes are minor.

The increased number of summer cattle in this allotment would reduce the presently available pronghorn forage. Although this represents a loss of food and cover, the management objectives for populations would be met with the wildlife allocation.

The winter, season-long sheep use may adversely affect the wintering pronghorn by increasing the sheep-pronghorn forage and cover competition on the crucial winter ranges. Even with the cattle conversions, the activation of the present nonuse would result in more sheep on the allotment during the winter period (see Livestock section). With this increase in sheep use of two bands over the present situation, competition between sheep and pronghorn during normal winters would occur. As explained for the Ferris, the distribution patterns of the pronghorn would be expected to change as more sheep use the area, thus forcing these animals into less suitable habitats lacking adequate food and cover. An increase in short-term to long-term winter losses would be expected to occur from the additional stress, but it is impossible to adequately estimate such losses. However, using Taylor's data (1975), it is estimated that the increased sheep use would reduce forage presently available to pronghorn. Although there would be enough forage allocated to support the management objectives for populations, this would represent a reduction in habitat quality from the present situation.

Cyclone Rim Allotment. The season of use and the class of livestock would be expected to have the greatest impacts on pronghorn. The Cyclone Rim contains approximately 73,966 acres of crucial pronghorn winter range. Between 3,000 and 4,000 pronghorn may winter in this allotment.

With the addition of 10 bands of winter sheep and increased numbers of winter cattle using this allotment, competition for food, cover, and space would increase over the present situation. The increased consumption of forage would reduce the presently available pronghorn forage. However, adequate forage would be reserved to meet the pronghorn management objectives. But, the pronghorn carrying capacities would be less than at present.

Because of the additional bands of sheep, competition for space would be greatly increased. Since the increased numbers of sheep bands mean more herders, camps, dogs, etc., pronghorn would have fewer places to weather out heavy snow storms. If the herders choose to move their sheep to the better cover areas, pronghorn would be forced into less preferred areas. In periods of heavier snow during normal winters, this competition may contribute to unquantifiable pronghorn losses. However, during the most severe winter situations, the pronghorn are forced to move out of the Cyclone Rim and ES area into the checkerboard. Thus, competition from livestock use would not occur in the ES area under the most severe winter situations, but would reduce the present pronghorn carrying capacity during normal snow conditions. However, based on required forage, the pronghorn management objectives would be met.

Summary of Grazing Systems. Overall, the proposed grazing systems in the ES area would reduce the presently available pronghorn forage. This would reduce the present forage capacity for pronghorn, but would still allow the herds to be maintained at the level of the management objectives.

Although summer and winter cattle use is expected to have minor impacts on pronghorn, the increased sheep use would exclude pronghorn from some preferred wintering areas. This would increase stress and mortality, but is presently unquantifiable due to a lack of research data.

The habitat condition would improve on 18,125 acres and degrade on 10,323 acres in the ES area due to the vegetative changes predicted in the Vegetation Section (Appendix B-3-12). This would help maintain pronghorn populations.

Fencing. Recent history in the Red Desert region has shown that livestock and highway fences have had major impacts on pronghorn populations. Riddle and Oakley (1972) assessed the effects of livestock fencing on pronghorn south of the ES area after the severe winter of 1971-1972. They estimated that 61.8% (3,111 animals) of the affected Red Desert herd was lost due to the severe winter and fence obstacles. Pronghorn in fenced areas had twice the mortality as those in unfenced areas. They observed that during periods of heavy snow cover and adverse weather conditions, all fence types (sheep net, five wire, four wire) were detrimental to pronghorn movement. However, three-wire fences were not included in the study and assessment.

The reasons for these substantial losses were a combination of factors. First, as some authors have noted (Riddle and Oakley 1972; Rouse 1954), pronghorn prefer to crawl under the bottom wire of a fence rather than jump over. During the 1971-1972 winter, the snow depth was at an excess of 18 inches in most places. This did not allow the pronghorn to crawl under the fences or jump over. Thus, these fences acted as major barriers to pronghorn movement. As a result, the animals died from injuries sustained while trying to get through the fences, from being held (by the fences) in areas of inadequate food and cover, or from reduced stamina as a result of repeated attempts to cross the fences.

A second factor was the migratory nature of the pronghorn in the study area. Riddle and Oakley (1972) concluded that in those areas where it was not necessary for pronghorn to migrate and where their basic needs were met, fences were not particularly detrimental. However, for migratory pronghorn, Rouse (1954) stated that, "If fences are so constructed and so located as to prevent antelope from reaching needed water, seasonal forage, or shelter, the fences are definitely detrimental to their welfare".

In the Seven Lakes ES area, the proposed fences should not impair pronghorn movements during periods of little (less than 4 inches) or no snow accumulation. Since all the proposed fences would be built with a twisted barbless wire 16 inches above the ground, pronghorn should be able to crawl under the fence (Rouse 1954) so long as snow does not prove a hinderance. The ability of the animals to negotiate the proposed fences would be low during the short term, and higher in the long term. Since they are presently not exposed to fences, and are unable to negotiate them, during the first 3 or 4 years, the fences may hinder movements and cause some mortality.

The greatest risk to the pronghorn would be those fences which would be standing during a severe snow storm. If enough snow were deposited to restrict movement, the animals would have difficulty getting past the fence. Some mortality would be expected to occur.

Type 1 Fencing. The proposed Type 1 fences would not be expected to hinder pronghorn movements during periods of little or no snow, with possible impacts increasing as snow accumulates. The Type 1 fences expected to have the greatest impact on pronghorn would be those which cross migration routes. Such fences include the Bull Springs fence, and the 11 miles of Type 1 fence between the Arapahoe Creek and Cyclone Rim, and between Arapahoe Creek and Stewart Creek allotments. In a heavy snow storm, these fences may hold pronghorn during migration, or alter historical movements by forcing the animals to trail along the fences to the fence end. Such alterations in behavior and migrating patterns may cause some mortality due to additional stress. However an accurate estimate of losses would be impossible to predict due to the lack of specific migration information and unpredictable weather conditions.

Let-down Fence. The proposed 27.8 miles of let-down type fence would have variable impacts on pronghorn, depending on the weather conditions, and whether the fence was in place during the summer, or let down for the winter (as designed).

During the time that the fence is down, there would be no significant hinderance of pronghorn migrations. However, should migrations occur while the fence is in place, or should a severe snow storm force the pronghorn to move across the fence in search of better cover, a substantial loss of pronghorn could occur (Public Hearing, Seven Lakes MFP). Although Riddle and Oakley (1972) estimated 1971-1972 winter and fence losses at 46.8% of the herd, it would not be possible to accurately estimate the losses due to the proposed fence since three-wire fences have not previously been studied. However, it must be stressed that the proposed fence would increase the risk of such mortality. With a recent history of fence induced mortality south of the ES area, it is expected that more fencing would compound this problem. It can only be stated that substantial, but unquantifiable, losses could occur.

Although the proposed let-down fences have been scheduled to be let down from October 20 to May 20, pronghorn migrations or severe snow storms may not correspond with these dates. The occurrence of a severe storm before or during the let-down date of October 20 seems possible since the severe storm of 1971 occurred on October 27 through October 30, and the variability in the occurrence of such storms could allow a storm to occur before the October 20 date (Personal Communication, U.S. Weather Bureau). Most of the losses were reported to have occurred before the weather moderated on October 31 (Public Hearing, Seven Lakes MFP). This was before any fences could be cut or gates opened to allow passage. Should a storm be severe enough to force major movements, there would be little possibility of letting the fence down to allow pronghorn to pass. Again, substantial losses could occur before the fence could be let down (Dexter 1977). Such losses would be expected to reduce pronghorn numbers for many years, as evidenced by the 1971-1972 losses. Although a severe early October or late September storm may occur only approximately every 25 years (University of Wyoming, Water Resources Research Institute 1977), the effects of such a storm on pronghorn populations could persist for at least 7 years as evidenced by the present population recovery (refer to Chapter 2).

Water. The impacts on pronghorn from the proposed water developments would vary with the water consumption rates of the animals under different environmental conditions. Studies conducted by the Wyoming Game and Fish Department (1967) in the Red Desert show that consumption rates depend on total monthly precipitation, evaporation rates, the availability of succulent vegetation, the water needs of lactating does, average temperature, and average maximum temperature. As water consumption rose, the distribution of pronghorn on the South Ferris, Seminoe, and Red Desert areas changed accordingly. Water was a critical environmental factor from early July until the beginning of October.

Sundstrom (1967) observed that 95% of the pronghorn in the Red Desert study were within 3 to 4 miles of water. Some areas on the desert contained most of the water, and it was these areas that seemed to dictate the distribution of pronghorn. In the South Ferris-Seminoe Mountain area, 71% (2,334) of the pronghorn were counted in areas where water was abundant, while 29% (954) were counted in areas where water was relatively scarce (Wyoming Game and Fish 1967).

Some authors have considered the development of water to be associated with the spread of pronghorn in areas where water was limiting (Wyoming Game and Fish Department 1967). June (1969b), stated that the development of guzzlers in southwestern Wyoming can be used to develop wildlife habitat lacking water, thus, getting better animal distribution throughout the area. He further states that due to better distribution and use of the existing habitat, wildlife populations can be expected to increase.

In the Seven Lakes ES area, the proposed water developments would make 207,697 acres, which are currently unsuitable (Map 2-10) available for pronghorn use from July 1 to November 1. Although there would be no increase of pronghorn habitat in the Ferris allotment, there would be 59,609 additional acres available in the Stewart Creek allotment; and 148,072 additional acres in the Cyclone Rim allotment where water is limiting. This would provide habitat for an estimated 1,000 additional pronghorn (Appendix B-3-11) during the summer season. Thus, pronghorn use would increase in the long term by an estimated 300 to 800 animals during the summer in these two allotments. However, since winter habitat is believed to be limiting (Taylor 1976), the year round carrying capacity would not increase. Summer use would be better distributed over the entire ES area, allowing more animals to use the summer range, but no net increases of the population would occur over the present winter carrying capacities.

Several water developments would be located within identified fawning habitats (Map 2-12). The presence of water may increase fawn production in the short term and long term by supplying pregnant and lactating does with adequate quantities of water.

A possible impact on pronghorn from the proposed water developments would be a feast or famine type of distribution due to shutting off those wells in the rested or deferred pastures. Pronghorn may come to depend on those developments during the summer seasons when they are operating. In the years that the wells are not operating, the animals might be forced to move into other areas with available water. This would reduce the summer carrying capacity and populations. Although Taylor (1975) found that distribution of pronghorn changed less than expected after summer water holes dried up, because forbs may have provided the needed water, and pronghorn were frequently seen in forb bottoms where subsoil moisture persisted, this would not apply to the proposed water developments in the ES area. These developments would not provide the quantity or quality of succulent forbs and grasses as would a mesic area. Thus, the distributions would be more dependent on the water developments.

Summary

The increased livestock use would reduce the presently available pronghorn forage. This would lower the present carrying capacity by the short term (1986), but there would be enough forage allocated to support the population objectives.

The proposed grazing systems would improve the spring-summer pronghorn habitat in the Ferris and Stewart Creek allotments through better production in the grass and forb layer. However, only 18,125 acres would improve in condition class. This should improve long-term fawn production and increase summer carrying capacities. However, it is not possible to adequately estimate the increases to the population due to a lack of research data. On the winter ranges in the Ferris and Stewart Creek allotments, 10,323 acres would be degraded due to decreased shrub cover. However, the winter ranges would adequately support the management objective populations.

The increased winter sheep use would reduce the presently available wintering habitat through the additional bands of sheep which would exclude pronghorn from preferred cover and forage areas. This would increase winter stress and the resultant mortality. However, no substantiating research is available.

The proposed fences would create a significant hazard to pronghorn in the ES area. As designed, the fences would have little effect on pronghorn during the summer season when there is a low probability of heavy snows. Although some animals would invariably be lost during the first 3 to 4 years while they are largely unfamiliar with fences in those areas, over the long term, few mortalities would occur during the summer periods. The greatest threat to the pronghorn would occur during the spring and fall while the let-down fences are in place. Should severe storm conditions force the pronghorn to migrate across the proposed fences, substantial losses could occur. Although this would occur only every 20 to 30 years, a reduction similar to that which occurred in 1971 could have effects lasting at least 7 years.

The proposed water developments would provide late summer habitat for approximately 1,000 pronghorn over the long-term period. However, only an increased use by 300 to 800 animals is expected to occur in these areas presently unsuitable for late summer use. These same developments would be less effective in making suitable summer habitat should the developments be turned off when livestock are not in the pasture if pronghorn become dependent on these waters.

Mule Deer

Grazing Systems. The projected impacts on the mule deer in the Seven Lakes ES area are likely to reflect the vegetative changes resulting from the proposed grazing systems, and the space and forage competition between the livestock and deer.

Although competition is believed to occur between domestic livestock and mule deer, as discussed by Mackie (1976), the resulting impacts or quantification of such impacts are not presently known.

Ferris Allotment. The proposed deferred grazing system in the Ferris allotment is expected to slightly increase mule deer carrying capacities. Since the browse species are expected to undergo only minor changes, the vegetative condition of the deer winter range would not significantly change. However, the increase in the grasses and forbs may account for a slight enhancement of mule deer spring and summer range capacities. This increase may account for a slight long-term increase of mule deer due to better spring and summer ranges. However, research is lacking to determine such habitat effects on mule deer populations.

Competition would increase on the south end of Lost Soldier Divide since both cattle and deer use the big sagebrush draws as cover. Competition here would not be expected to be great since forage competition between mule deer and cattle is only at a 15% overlap (Bureau of Land Management Manual, Technical Supplement 6601-6), and there are only 11 competitive winter sheep AUMs required for the deer in this allotment. Competition would decrease further during the spring due to the deferment of one pasture each year. However, this would be negated by the early use pasture in the other half of the allotment.

Stewart Creek Allotment. The three-pasture deferred-rotation system proposed for this allotment would allow for a higher level of cattle use on the winter ranges than is presently occurring. Since the Sand Spring pasture would receive fall cattle use 2 of every 3 years, and since the stocking rate of cattle would be higher than present use, late fall cattle use during the period when cattle shift their diets from grasses to browse (bitterbrush) (Tueller 1976; Taylor 1975), would cause a long-term decrease in the amount of winter forage available to mule deer. Thus, grazing capacities would be reduced. However, since spring-summer range is believed to be limiting, the reduced capacity of the winter range may not affect the deer populations.

The deferred systems are projected to increase the grass-forb understory. This would improve the year-round vegetative condition for mule deer use, but this would not be expected to significantly affect the populations in the allotment.

Cyclone Rim Allotment. The competition from the winter grazing use may place some severe stress on the mule deer on the 24,719 acres of crucial winter range in this allotment. A severe snow storm could increase forage and spatial competition between livestock and mule deer. Should both classes of herbivores be concentrated in the same area, some losses to the mule deer could result. Depending on the distribution patterns of the animals, losses could occur. However, such losses are not presently quantifiable due to the lack of research data.

Water Developments. It has been postulated that newly developed waters in arid regions may allow deer to inhabit areas not previously used, while the provision of water in these regions may provide a nutritional factor that can lead to population increases due to improved animal vigor and herd health (Teuller 1976). However, the dependability of such waters must be assured (Urness 1976) and maintained if deer are to be held on the areas permanently (Teuller 1976).

In the Seven Lakes ES area, nine proposed water developments could have the long-term potential to expand the mule deer summer range (Map 3-1) during the dry summer and fall period. If water is a limiting factor, the population may increase from the present 175 animals. However, studies have not been conducted in the area to quantify or determine if this is indeed possible.

Summary

The proposed grazing systems would maintain the present winter vegetative conditions for mule deer use. Spring and summer range would be improved with the increased production in the grass-forb layer. However, the present condition classes would be maintained over the long-term period.

The increased numbers of livestock would increase the present forage and spatial competition between livestock and mule deer, but it is not possible to adequately estimate the resulting impacts on deer populations.

The proposed water developments would have the long-term potential to expand mule deer range and increase the population by an unquantifiable amount.

Sage Grouse

Grazing Systems. The proposed grazing systems would affect the Seven Lakes ES area sage grouse populations through the realized changes in the vegetative composition and cover, and the seasons of grazing use which may result in some livestock trampling of the nests.

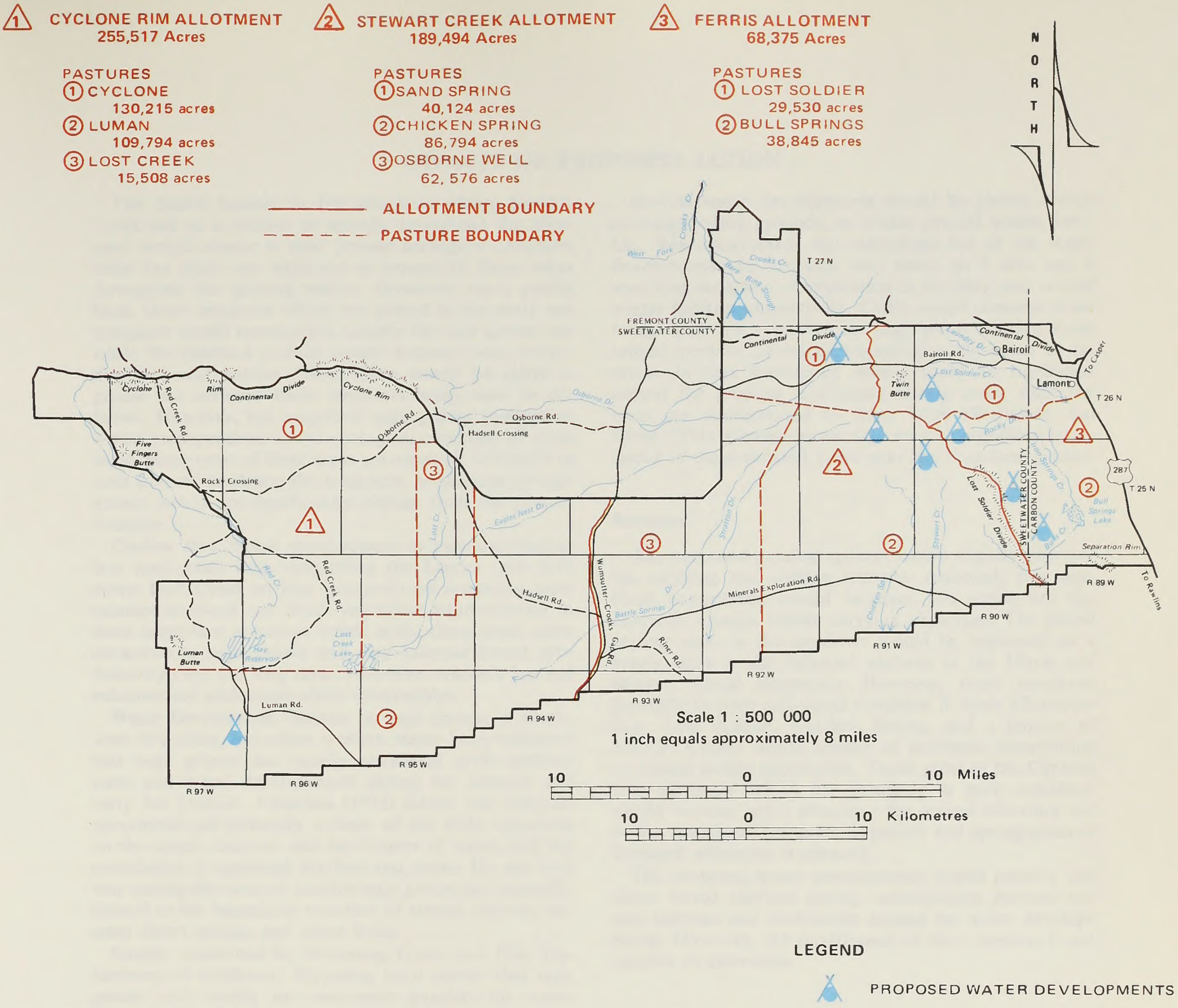
Studies on sage grouse have consistently shown that these birds are greatly dependent on sagebrush for both food and cover (strutting-nesting, roosting, and escape) during much of the year (Patterson 1952, Wallestad and Schladweiler 1974, Wallestad and Pyrah 1974), while meadows and riparian areas are critical during summer brooding periods (Patterson 1952, Peterson 1970). Therefore, sage grouse may be affected by livestock use through the resulting changes in sagebrush density, overall vegetative composition of the understory, and through the condition and composition of the meadow vegetation.

Ferris Allotment. The proposed grazing systems in the Ferris allotment would maintain or slightly improve the 6,572 acres of strutting-nesting habitat. Although there is a 3.5% projected decrease of sagebrush in the sagebrush types and a 25% decrease in the grass types, it is believed that this would not be significant enough to limit the grouse populations; thus this component of the habitat would support the existing population. However, an increase in the grass-forb understory would improve the long-term nesting cover, while producing a better invertebrate fauna for better brood production.

With the sagebrush overstory only decreasing slightly in its composition , the wintering areas and draw vegetation in this allotment would not significantly change from their present conditions. Beck (1977) stated that winter distributions of sage grouse were primarily a reflection of availability of sagebrush above snow, slope, and aspect. Since livestock use is expected to maintain sagebrush density, the ability of these areas to adequately support existing populations of sage grouse should also be maintained. Thus, existing winter carrying capacities and populations are expected to be as they presently exist.

Changes in meadows and riparian areas, because of their importance as brood rearing areas, have more direct effects upon sage grouse than changes in other vegetative types (Western States Sage Grouse Committee 1975). Even though slight vegetative production increases are predicted on the meadows in the ES area, removal of vegetation by grazing cattle is expected to keep in poor condition those meadows that are presently in poor condition for sage grouse. Slight benefits to sage grouse should result from the proposed deferment during the period that a given meadow is deferred because a deferred meadow provides better cover for nesting and brooding and provides better food conditions. The overall long-term effect on grouse production would be the result of changes in ecological condition of the meadows, which would remain poor along Lost Soldier Creek and good in Bull Springs.

Stewart Creek. The proposed grazing systems in this allotment would maintain or slightly improve the vegetation on the 22,955 acres of strutting-nesting habitat identified in the allotment. With the increased production in the grass-forb layer and essentially unchanged composition of big sagebrush type overstory, nesting cover, winter habitat, and brood habitat would improve. However, whether this would significantly increase grouse production is not known.



PROPOSED WATER DEVELOPMENTS

THAT WILL INCREASE SUMMER MULE DEER HABITAT

Seven Lakes Grazing

Environmental Statement

Map 3 - 1

The brood habitat in the meadows along Stewart Creek and at a number of springs throughout the allotment would remain in their present ecological condition since the cattle are expected to remain in those areas throughout the grazing season. However, on a yearly basis, those meadows which are grazed in the early use treatment would become less suitable for sage grouse use while the deferred pasture would become more attractive as brood habitat. Thus, there would be shifts in grouse use between those meadows being used or deferred. However, the long-term sage grouse production would be dependent on the ecological condition of these areas. Since most of these areas are expected to remain in their present condition the long-term production of sage grouse would not significantly change from the present situation.

Cyclone Rim. Some improvement in meadow vegetation may result from controlling the Lander user drift down Lost Creek to Hay Reservoir by removing most summer livestock use. Such vegetative improvements in these important use areas would make these areas more attractive to sage grouse and may increase brood productivity over the long term. However, research has not substantiated such cause-effect relationships.

Water Development. Studies on sage grouse in southwest Wyoming and other western states have indicated that sage grouse are closely associated with wetland areas and water developments during the summer and early fall seasons. Patterson (1952) stated that seasonal movements are primarily a result of the wide variations on the nature, amount, and distribution of water, and the availability of sagebrush for feed and cover. He also said that during the summer months sage grouse are normally limited to the immediate vicinities of stream courses, isolated desert springs, and water holes.

Studies conducted by Wyoming Game and Fish Department in southwest Wyoming have shown that sage grouse will readily use man-made guzzlers for water (June 1969b). These studies indicated that the wildlife-use trend shows heavier use during the drier periods, with definite decreases in use, in relationship to the amount of rainfall received. June, in an earlier assessment (1968) on the guzzlers, stated that they can be used to develop wildlife habitat lacking water, thus getting better distribution throughout the area. Due to better distribution and use on existing habitat, wildlife populations can be expected to increase.

In the Seven Lakes ES area, the proposed water developments could be expected to increase the distribution of sage grouse during the summer periods of limited water availability. In the latter part of the summer and early fall, survival of sage grouse could increase due to the increased availability of water near meadow areas. But if succulent vegetation did not establish from the overflow water, water developments in dry areas without meadows would not significantly increase grouse production since it is believed that it is the vegetation associated with surface waters that attracts grouse and improves grouse habitat and production. However, studies that quantitatively demonstrate a cause-effect relationship between water, survival, and production are lacking.

Several water developments would be placed within strutting-nesting grounds, or within crucial winter habitats. The construction and subsequent use of the water developments by livestock may cause an 8 acre and 6 acre long-term loss of vegetation in strutting and crucial winter habitats, respectively. Cattle would consume some forage and cover needed by sage grouse during these critical periods. Livestock trampling could cause an increase in nest destruction which could be significant around the projects in strutting-nesting areas, since the nests are concentrated in these areas (Wallestad and Pyrah 1974). Grouse production may be significantly reduced in these isolated areas over the long-term period.

Summary

The proposed grazing systems would slightly improve the strutting and nesting habitats. Although the sagebrush composition would decrease, this would not significantly change winter carrying capacities. The brood rearing areas in the meadows would be improved on a yearly basis in the deferred pastures in the Ferris and Stewart Creek allotments. However, those meadows presently in poor ecological condition in these allotments (e.g., Lost Soldier, Chicken Spring, and a portion of Stewart Creek) would remain as problems contributing to limited grouse production. Those areas in the Cyclone Rim allotment which are presently in poor condition would become more attractive for grouse brooding use as the ecological condition improves and spring-summer livestock utilization is reduced.

The proposed water developments would possibly improve brood survival during water-limited periods, but may increase nest destruction around the water developments. However, the significance of these impacts is not possible to determine.

Waterfowl

Studies conducted on the various species of waterfowl in the western states have shown that waterfowl use of stockwater ponds is influenced by produced and residual vegetative cover, size of reservoirs, livestock trampling, and water quality (Leopold 1933, Gjersing 1974, Kirsh 1969, Mundinger 1976, and Berg 1956).

In the Seven Lakes ES area, waterfowl nesting and production are keyed to the upland habitat conditions around the livestock ponds and drainages. Most of the nesting ducks in the area (e.g., mallard, gadwall, pintail, American wigeon) are upland nesters who will nest up to 400 yards from water (usually within 100 yards), and utilize saltbush, greasewood, or sagebrush for nesting cover (Bellrose 1976). The proposed action would affect waterfowl use and production through the effects of the grazing systems, and the protective fencing of four reservoirs.

Grazing Systems. The proposed grazing systems would affect populations through the impacts of livestock use on emergent, shoreline, and upland vegetation, and the impacts of livestock trampling on the birds' nests.

Ferris Allotment. The two pasture deferred rotation system should affect production by allowing waterfowl to successfully nest during the deferment. Since livestock would not be trampling nests or vegetation, or grazing the shoreline or upland vegetation during the deferment treatment, waterfowl nesting success should improve over the early use treatment. However, the consumption and trampling of vegetation during the later use period would reduce the residual cover for the following nesting season, while placing enough pressure on the shoreline vegetation so that it would not significantly improve. But over the long-term period, waterfowl production would improve over the present situation since the early nesters (mallard, pintail) would be able to nest without livestock destroying nests or consuming forage in the deferred pastures. The May 15 to August 1 grazing treatment would be expected to adversely impact waterfowl production by the effects of livestock trampling of nests, and the grazing and trampling of emergent and shoreline vegetation. Livestock use at this time would reduce the beneficial impacts of the deferment by grazing and trampling the vegetation before seedripe. However, livestock use of ponds would be less at this time than later in the summer due to the overall distribution of water. Some vegetation and waterfowl cover could be allowed to become established. Thus, the waterfowl production would increase slightly by the long term over the present situation, with nest destruction still occurring.

Stewart Creek Allotment. The three-pasture deferred-rotation system proposed for this allotment would be expected to have similar impacts on waterfowl as those described for the Ferris. However, this system would have lower increases in production since each pasture is only deferred every 3 years, with no rest for vegetation after August 1.

Cyclone Rim Allotment. Waterfowl production would improve in this allotment over the long-term period since spring and summer livestock would be largely removed from this allotment. There would be some impacts to waterfowl nesting on the small ponds and permanent lakes (in wet years) when sheep are herded to water. Trampling of nests, shoreline, and vegetation would result. However, such impacts would be far less than are presently occurring since summer cattle would be eliminated from this allotment. Thus, a long-term increase in waterfowl production could occur in the allotment due to decreased livestock pressure on the vegetation during the spring and summer seasons. Winter sheep use would not be expected to reduce vegetation during the winter use season, since the plants are dormant and the ground is usually frozen at this time.

Reservoir Fencing. The proposed fencing of Sooner, Rocky Draw, Whitewater, and No Name reservoirs would be expected to improve waterfowl use and production. It would be expected that waterfowl pair and brood use would increase on the proposed fencing projects since nesting, brooding, and escape cover would be improved. Mundinger (1976) cited literature that the presence of shoreline vegetation improves the attractiveness of stockwater reservoirs for breeding pairs, while residual vegetation on upland sites is important for early nesting mallards and pintails: use of these fenced areas would be expected to increase. It is estimated that these proposed improvements would increase the long-term waterfowl use by five to ten pairs in the ES area.

Long term use by migratory waterfowl would also be expected to increase. These fenced ponds may attract more temporary use through the selection by waterfowl of vegetated ponds. Such results have been observed on various fenced ponds in the Rawlins District.

Summary

The proposed grazing systems in the Ferris and Stewart Creek allotments would be expected to improve the waterfowl nesting and brooding habitat during the deferred grazing treatments. The early use treatments would continue present damage to waterfowl nests. However, there would be an improvement over the present situation since some pastures would be deferred during the nesting season. In Cyclone Rim, long-term production would also improve since spring-summer livestock use would be reduced. Thus, the overall production would improve by the long-term period.

The proposed reservoir fencing would improve waterfowl nesting and brooding habitat resulting in a five to ten pair increase of use.

Nongame

Grazing Systems. Studies by several authors have shown that moderate grazing may improve habitat for some species in some cases. More important than whether an area is grazed is how, when, and to what extent it is grazed (Buttery and Shields 1975). The intensity of impacts that grazing would have on wildlife is dependent on the grazing system that is employed, and the intensity of livestock use.

With the activation of nonuse under the proposed action, approximately 29,169 AUMs (Table 2-18) which are presently available for all wildlife to use as food and cover would be consumed by livestock. Since this food and cover is presently available, and has been for the past several years, it is presumed that many species of wildlife have become dependent on these available resources. Thus, with the activation of nonuse, this forage would be consumed by livestock and would no longer be available for wildlife. Those animals which have become dependent on the unused grass, forb, and browse plants for nesting, loafing, or escape cover and/or for food would have to move to more suitable areas or would succumb to starvation or predation as a result. Those nonmobile, nongame species (e.g., ground squirrels, jackrabbits, lizards, etc.) would be reduced while the more mobile animals (vesper sparrow, lark bunting, etc.) would move to more suitable areas. Thus, the numbers of individuals and the diversity of the wildlife species would be reduced in the short term as the forage is consumed under full active use. There would be a rebounding increase between the short term and long term as the grazing systems allow the initial forage loss to be replaced by increased forage production. However, a long-term change in vegetative composition would affect those animals which are dependent on the present vegetative composition versus the composition resulting from the proposed action. Therefore, a long-term increase in nongame numbers and species diversity would result from the implementation of the proposed action.

The projected vegetative increases in the grass-forb layer may increase the food base for various seed-eating rodents and birds. However, the projected increases in cover may increase some rodent populations more than the changes in food (Johnson and Hansen 1969). The increased level of winter sheep use and summer cattle use may change habitat structure through more kinds of vegetation being utilized. Since bird diversity increases with the number of strata in the vegetation and with the evenness of the foliage among the strata, the dual use may be a disadvantage to bird populations by simplifying the vegetation layers (Buttery and Shields 1975).

Perhaps the most significant impacts on nongame wildlife would be as a result of the long-term changes in the riparian habitats. In the Seven Lakes ES area, the riparian habitats are expected to remain in their present condition. Livestock would remain in these habitats during the time they are in an allotment. As a result, herbaceous vegetation is consumed while browse may be hindered from reproducing, resprouting, or expanding their amount of cover. Therefore, with the consumption of vegetation, the riparian habitats become more simplistic through a reduction of the vegetation layers. As the vegetative complexity is reduced, the numbers and diversity of the corresponding nongame animals also is reduced. Thus, the long-term result of the proposed grazing systems would be the continued poor quality of some riparian areas with a corresponding loss of nongame numbers and diversity in these habitats, while keeping populations below the potential of these highly productive areas.

Range Improvements. The proposed fences may produce available habitat for nongame birds and raptors by providing hunting perches for raptors, flycatchers, and shrikes, and offer resting areas for other birds (Buttery and Shields 1975).

The proposed water developments would be expected to benefit most nongame species by increasing the amount of available habitat presently limited by water. Studies conducted by June (1968) showed that all forms of wildlife benefited from guzzler type water developments. Cottontails and songbirds established permanent residence at the sites. Other animals observed were bobcat, coyote, badger, skunk, hawk, golden eagle, mourning dove, meadowlark, horned lark, lark bunting, etc.

Buttery and Shields (1975) pointed out that water developments may be beneficial to bird habitat through the increase of insects in the area, creation of dusting areas, and the creation of new habitat in the form of water, mudflats, or marsh (overflow pits). However, he found adverse impacts on birds may occur due to the water attracting predatory mammals and snakes, and the overuse and resulting deterioration of the area in the vicinity of the water.

The windmill structures may be used for perches by various nongame birds and raptors, while attracting various mammals (e.g., cottontails, least chipmunks) which would use the structures for cover.

Thus, it may be predicted that the proposed water developments would increase nongame wildlife populations by the long term through the advent of new habitat, better distribution of animals in existing habitats, and the attraction of some prey animals for certain predators.

However, there would be a loss of habitat due to the construction and subsequent livestock use at each of the 35 proposed developments. The 1.8 acres of vegetation lost at each site represents a loss in food and cover to the animals previously residing there. Those animals would either move to another suitable site, or stay and be exposed to increased predation pressure from the loss of cover and decreased food supplies. This would cause a short-term decrease in these animals, but an overall long-term increase due to the structures and revegetation increases as usable cover.

The proposed fencing of four reservoirs could result in an increase of nongame animals through the improvement of food and cover for many species. Those increases would be attributed to improved vegetation cover, composition, and production. Rodents may increase due to greater availability of food and cover (Johnson and Hansen 1969) which would improve prey availability for raptors (Howard and Wolfe 1976) and mammalian predators (Nellis and Keith 1976), which may in turn change food habits to utilize the increased prey source. Such available prey may provide opportunities for an increase in these predatory animals. Various birds may inhabit the area due to the changes in vegetation. Shorebirds (e.g., killdeer, avocet, black tern) and citerids (e.g., red-winged blackbird, meadowlark) may increase use of the areas for migratory and nesting purposes. Increased long-term production of these birds may result. Such fencing also provides an opportunity for increases in reptiles and amphibians by producing cover and insect and plant food necessary for the survival of these species.

Overall, the fencing of reservoirs may increase both the numbers of individuals, and the diversity of species in the protected areas. Improved productivity of the ecosystem may be expected due to better productivity of the plants, and subsequent utilization of available resources by consumer and predatory animals.

Threatened and Endangered Species

The proposed grazing systems, forage allocations, and range improvements would be expected to have minimal impacts as discussed below on any threatened or endangered *species (Federal Register* 1976) that may occur within the Seven Lakes Grazing ES geographic boundaries.

American Peregrine Falcon

The proposed grazing systems and associated projects would benefit migrating peregrine falcons by improving waterfowl habitat and populations in the ES area (refer to Waterfowl section). The expected waterfowl increases on the four reservoirs proposed to be fenced would supply possible prey (waterfowl) for these raptors. The waterfowl increases from the grazing systems would also help supply prey.

Black-footed Ferret

The proposed grazing systems would not significantly affect the vegetative communities which support the prairie dogs in the ES area. Since it is believed that prairie dogs, in low precipitation zones, are able to maintain the plant community at their preferred seral stage, the effects of the grazing systems (refer to the Vegetation section) would be buffered by the prairie dogs themselves (personal communication, Clark 1978). Thus, this important prey item would continue to be available for any unidentified black-footed ferrets which might occur in the ES area.

Impact Summary

Forage Allocations

There would be a 2,441 AUM reduction in the wildlife allocation under the proposed action. This would occur because the 4% and 5% allocations in the Seven Lakes and Ferris allotments would no longer be given to wildlife. However, under the proposed action, the 1980 Wyoming Game and Fish Department big game management objectives would be met with the forage allocated in the proposed action. In addition, there would be 2,109 AUMs available for the other wildlife in the ES area. Big game populations would not be limited by forage under normal conditions, and some forage would be available for other wildlife species. However, there would be less available vegetation for wildlife use than exists today. Therefore, there would be less food and cover available for the numerous nongame species in the ES area. A reduction in numbers and diversity of these animals would be expected to occur.

Grazing Systems

The increased livestock use would reduce the presently available pronghorn forage. However, the forage allocations and proposed grazing systems would provide forage and cover to support the Wyoming Game and Fish Department 1980 management objectives of 5,000 winter and 1,339 summer pronghorn in the ES area.

The projected increases in the grass-forb layer would allow for better reproductive success for those species depending on grasses and forbs for good production. Pronghorn spring-summer habitat condition rating would improve on 18,125 acres. Mule deer and sage grouse winter habitats and sage grouse strutting-nesting habitats would be maintained or slightly improved in the Ferris and Stewart Creek allotments, but the condition ratings would not change. Thus, the carrying capacities in these areas would not significantly change over the long-term period. Although pronghorn crucial winter habitat would be degraded on 10,323 acres in these two allotments, the carrying capacities are believed to remain at present levels.

Riparian areas along Lost Soldier and Crooks Creek would continue to be overused by livestock. Thus, these areas would continue to support existing populations but produce fewer than potential nongame wildlife numbers and species diversity. Sage grouse production would also be limited.

Meadow areas would continue to produce sage grouse and nongame animals as limited by their present ecological condition. The deferred use of these areas would make these areas more attractive to these animals. Corresponding increases in production would occur over the long-term period.

Livestock use during cricital winter periods would increase over the existing situation. An increase of 4 bands and 10 bands of winter sheep in the Stewart Creek and Cyclone Rim allotments, respectively, would increase the competition for forage, cover, and space. Although this is expected to increase winter stress and mortality, the quantitative impacts on pronghorn and mule deer are impossible to adequately assess.

Fences

The proposed fences would increase the risk of additional winter mortality to pronghorn. Based on the migrational behavior of these animals in the ES area, substantial losses could occur if the fences are constructed. The proposed let-down fence along the Arapahoe allotment could reduce pronghorn populations for at least 7 years if a severe snow storm occurred while the fence was in place (May 20 to October 20) based on the present recovery from the 1971 winter (refer to Chapter 2).

If severe storms and migrations occurred when the fence is let down, the pronghorn migrations would not be hindered and losses due to fencing would not occur. Summer movements would not be significantly hindered since the proposed fence has three wires spaced 16 (twisted barbless), 27 (barbed), and 38 (barbed) inches above the ground. Mule deer would not be significantly hindered by this type of fence during any season.

The Type 1 fence would not hinder pronghorn movements during periods of little (less than 4 inches) or no snow cover. However, losses could occur should the animals be forced to move across these fences during severe winter storms. The Bull Springs fence could be a barrier to migration.

Water Developments

The proposed water developments would increase pronghorn populations by 300 to 800 animals in the long term during the late summer season. Mule deer could increase slightly while sage grouse would not significantly increase from water developed in dry areas. Construction and heavy livestock use would reduce sage grouse strutting-nesting habitat by 8 acres from trampling and nesting cover loss, and reduce winter carrying capacities by 6 acres. Various nongame birds and mammals may increase in numbers and diversity by establishing residency around the developments, although in the short term, habitat would be lost.

Aquatic Wildlife

Grazing Systems. The proposed grazing systems in the Ferris and Stewart Creek allotments may maintain or slightly degrade the aquatic habitats along Lost Soldier Creek and Crooks Creek. Research conducted by Claire and Storch (1976) in Oregon has shown that uncontrolled livestock grazing can cause severe damage to a streamside and reduce fish populations. Increasing water temperature due to the elimination of shade-producing broadleaf shrubs, and the increased sedimentation from the streambank breakdown caused by livestock trampling accounted for this reduction. Such livestock use causes changes in the stream morphology (e.g., channel widening, loss of undercut banks) which decrease fishery productivity by decreasing suitable cover while increasing sediment yield and temperatures (Kennedy n.d.). Thus, the populations of the aquatic wildlife would depend on the establishement of shade-producing vegetation, and the stabilization of streambanks and overland sediment flows.

Ferris Allotment. The two-pasture deferred-rotation system proposed for this allotment may slightly increase the short-term quality of aquatic habitat along Lost Soldier Creek over the existing situation. However, because the cattle can be expected to concentrate in the drainage, the long-term increases may be negligible. It is doubtful if the deferred treatment followed by a late summer grazing (after August 1) and early spring (May 1) grazing treatment would allow for the establishment of riparian vegetation or stable streambanks. Livestock concentrations would be expected to occur, causing physical trampling, sedimentation, and a lack of willow re-establishment. Since beavers are dependent on riparian vegetation for food and dam building materials, the lack of willows may keep these animals from becoming established or maintaining their present populations. Without beaver activity (dam building), it is doubtful that a fishery could be established in Lost Soldier Creek since beaver ponds would be the only source of stable water habitat for a fish population.

The early grazing treatment would be expected to adversely impact riparian vegetation by the concentration of increased cattle numbers during the growing season. This would reduce streamside cover while increasing sediment yields during high flow periods. Since cover would be reduced, maximum and average temperatures would increase while oxygen levels decreased. Heavy use of riparian vegetation during the growing season would reduce the vigor and seedling establishment. Willows, an important food and cover species for beaver, may not be given adequate rest to allow for growth and establishment. Pressure from both wildlife and livestock on these plants may cause a decrease in willow cover, thus reducing beaver populations. The resultant reduction of beaver would mean a decrease in streamflow stability and year-round pond habitat for fish.

The late grazing treatment would allow for rest during the growing period, but would probably result in heavy livestock concentrations during the later, drier period of the season. This grazing cycle use period would allow for continued vegetative loss through forage consumption and trampling. Continued streamside trampling would also occur, causing sediment loads and stream widening.

Stewart Creek Allotment. The proposed three-pasture deferred grazing system would be expected to only slightly increase the short-term aquatic habitat along Crooks Creek. A deferred treatment in the Sand Spring pasture every 3 years may only allow for negligible re-establishment of cover and stabilization of streambanks.

The deferred treatment would be expected to allow some establishment of streamside cover since these plants would be allowed rest from grazing during the growing season. Streambank erosion and sloughing would also be reduced, thus decreasing sediment yields while improving trout spawning and rearing habitat. The increased cover may allow for lower water temperatures, lower sediment yields, more trout resting and hiding cover, better stream channeling, and more terrestrial insect food sources.

The graze after seedripe treatment on this pasture may allow for concentrated livestock use since the animals would be attracted to the stream during this drier period. Streambank erosion and vegetative damage would be expected to occur. Willows would receive heavier cattle use at this time since cattle switch from grass to browse species. It is doubtful if the spring rest would provide enough plant vigor to offset this use. Thus, willow cover would not significantly improve.

The season-long treatment that would occur 2 of every 3 years would be expected to have the most adverse impacts on aquatic wildlife. This season-long use may not allow vegetative increases in cover since the livestock would graze the plants during the growing season. Sediment yields from streambank trampling would be increased during the high flow periods of spring, and later through the grazing season. Since this treatment occurs for 2 years in a row, re-establishment of vegetation (e.g., willows and herbaceous plants) may be quite slow. There would be no real increases in the long term.

Aquatic wildlife (e.g., brook trout, beaver) would be expected to remain at present population levels or slightly decrease in numbers due to sustained heavy use of Crooks Creek by livestock. Increased numbers and concentrations of cattle would probably offset the positive results of the deferred treatment. Thus, vegetative loss by consumption and trampling, and streambank erosion due to livestock use would be expected to continue, maintaining or reducing the aquatic habitat quality and wildlife numbers along this riparian zone.

Wild Horses

No studies of the impacts to wild and free-roaming horses from livestock grazing systems have been found. However, proposed fences would limit the horses' free-roaming behavior. This impact would be most acute in the Stewart Creek allotment because it contains the most migratory wild horses in the ES area, and because the proposed boundary fences would block the horse migration paths.

The proposed fences could cause mortalities to a few wild horses, especially young ones; however, no data are available on which to base an estimate of losses. The fences could also cause injury to some horses. Impacts of the fences would be greatest in the short term. The horse herds would adjust to the fences and become less impacted by them over the long term.

The let-down fences are proposed to be kept erected during the summer months, which is the major breeding time of wild horses, and that time during which considerable mixing of bands occurs due to breeding activities. The newly erected fences would limit the movement of horses, thereby reducing the mixing of the horse bands. Thus, the proposed fences could create smaller populations of breeding animals—a reduced gene pool—and increase inbreeding of the wild horses.

The proposed allocation of 464 winter sheep AUMs (Table 1-4) for the wild horses would be inadequate to sustain the maximum of 135 head that would be managed for under the proposed herd management area plan (HMAP) because the allocation was made only on the basis of yearlong competition between winter sheep and wild horses. It should have included summer cattle competition during the summer grazing season because cattle diets overlap those of horses more than do those of sheep (Hansen 1975). The proposed allocation of forage for wild horses is 499 winter sheep AUMs too low (Appendix B-3-6). Failure to make adequate forage allocations could result in slight overgrazing of the allotments, leading to slight deterioration of the vegetative and soil resources, in turn lowering the long-term productivity of the area.

Under the proposed action, when a pasture is deferred from cattle use, access to or operation of the water developments in that pasture would be curtailed in order to prevent the cattle from being attracted into the deferred area. Denying livestock access to water sources in pastures being deferred would also deny wild horses access to these waters. This could force the wild horses to leave their preferred concentration areas, causing them to move into areas with less suitable conditions, and conflicting with the "free-roaming" concept. It is believed wild horses are consistently found in the concentration areas because these areas offer the horses the best available combination of forage, water, and protection both from weather and man-caused harassment. Areas less suited for wild horses could cause changes in the social behavior and physiology of the horses.

The improved distribution and increased number of water developments in the proposed action in the short term would cause the wild horse bands to become more dispersed. Areas of forage previously unavailable to wild horses because of long distances from water would become open to their grazing.

Increased dispersion of wild horses would lead to less interaction between the horse bands in each grazing allotment, and, like the fences could result in an inbreeding increase.

Under the proposed systems of grazing management, the wild horses could reasonably be expected to sustain increased harassment for several reasons. The herders gathering livestock would go into wild horse areas looking for their livestock and would disturb the horses. Second, the construction and maintenance of the various proposed projects would cause more people to be afield than before, thus disturbing the wild horses with noise and activity. Third, the increased number of livestock, especially cattle, would cause increased problems of forage, water, and space competition for the wild horses. This would lead to a lessening of habitat quality for the wild horse population in the Seven Lakes ES area, and increased disturbance to the horses.

The major impacts on wild horses associated with the proposed action would be some unquantifiable injuries and mortalities along with possible increased inbreeding caused by the proposed fencing, unnatural and undesirable movement of the horses away from their areas of concentration, and increased harassment.

IMPACTS ON CULTURAL RESOURCES

As outlined in 36 CFR 800 (Procedures for the Protection of Historic and Cultural Properties), adverse impacts on cultural resources include the following; (1) destruction or alteration of all or part of the property, (2) isolation from or alteration of its surrounding environment, (3) introduction of visual, audible, or atmospheric elements that are not of character with the property or alter its setting, (4) transfer or sale of a federally owned property without adequate conditions or restrictions regarding preservation, maintenance, and use, and (5) neglect of a property resulting in its deterioration or destruction.

Because the magnitude of disturbance to cultural resources is difficult to quantify, the following parameters are provided as a general range of the probability of impact:

Minimal (slight)—The impact(s) would be small or slight; less than 15% effect on the cultural values. For example, if an archeological site was 10% disturbed by construction activities, the impact would be described as minimal.

Medium (moderate)—The impact(s) would be obvious; between 15% and 50% effect on cultural values.

Severe (high)—The impact(s) would be significant; 50% to complete destruction of cultural values.

Grazing Systems

Livestock grazing in general has negligible effects on archeological sites except in areas where livestock concentrate. In an experiment done by Roney (1977) in which the effects of trampling on artifacts around stock tanks was studied, it was found that 48% (medium impact) of a group of artifacts had received damage from trampling. The damage ranged from nicking to major breakage. At least 38% (medium impact) of the artifacts were horizontally displaced and nearly all were vertically displaced. Chipping may alter characteristics of an artifact, influencing the interpretation of its use. Cattle cause heavier concentrated trampling around water sources and in trailing than do sheep. Sheep cause more spatially extensive damage than cattle, because they graze over a more extensive area during a particular grazing system. However, because of their smaller size, they exert less pressure (approximately 9 pounds pressure/ square inch versus a cow's 24 pounds pressure/ square inch—Lull 1959); therefore soil compaction which could disturb data levels within an archeological site would not be as intensive. Cultural resources located in historical sheep bed grounds have already been heavily damaged or destroyed and no further adverse impact would be anticipated. The proposed action would result in new bedding areas being established, increasing the possibility that previously undisturbed cultural (archeological sites associated with hunting, gathering, and camping activities) resources could be severely impacted. Although the proposed action would limit bedding in an area to 7 days, this would be sufficient time to destroy cultural sites if present. The probability of encountering cultural resources in protected draws or drainages is high. Here, where sheep herders concentrate their animals to protect them from winds, cultural data loss is now extensive, and would continue to be so under the proposed action.

The proposed grazing treatments applied to the area would cause impacts depending on the season of pasture use, the distribution of animal classes, and the location of cultural resources.

Because the treatments would be combined to form grazing systems, benefits of one treatment to the preservation of cultural resources within an allotment might be offset by the use of another treatment in the same allotment.

All pastures would be rested from April 1 to May 1 when the soil is wetter and more subject to compaction from trampling. This would lessen the chances of cultural resource damage during this period.

Summer grazing, which includes treatments A, B, and D (May 1-October 31) would occur in all pastures of the Ferris and Stewart Creek allotments and the Cyclone pasture of the Cyclone Rim allotment. Although May and June are among the months with the highest precipitation levels, water quickly percolates through the loose, sandy soil. Therefore, precipitation is generally not a factor for cultural impacts during this period. Trampling impacts occurring under the present situation in the Ferris incommon and Stewart Creek allotments would increase slightly under the proposed action due to increased numbers of livestock. While the development of new water sources would distribute livestock use and decrease trampling around existing water sources, the possibility exists that presently unknown cultural sites would be damaged. Although site specific inventories would be conducted prior to construction, disturbance of subsurface cultural materials could occur over a 5 acre area around each of the 35 proposed developments, with damage inversely proportional to the distance from the water developments.

In the Cyclone Rim allotment, there would be a decrease in the total number of summer livestock under the proposed action. This decrease, combined with the elimination of unauthorized summer cattle drift into the Cyclone Rim and Stewart Creek allotments, would substantially decrease trampling impacts to cultural resources under the proposed action during the summer months.

In general, winter grazing would have less impact than summer grazing because of added protection from snow cover and frozen ground during the winter.

Winter grazing of livestock (treatments C, E, and G) would occur in all pastures except Sand Spring (in the Stewart Creek allotment).

Winter livestock use would increase under the proposed action. Since this increased grazing would occur during the winter months when frozen ground and snow cover offer added protection, trampling impacts would increase only slightly over the present situation. However, trampling of sites located in sheep bed grounds could be more widespread due to the 7 day limit at the same location since a greater number of locations could be disturbed.

Under the proposed action, cairns at the Crooks Creek Medicine Wheel would not be impacted by livestock over and above the present situation. The boulders forming the cairns are large and would not be shifted if an occasional cow or sheep passed across them. Livestock trailing through the site is not likely, because there are no fence lines proposed in the area, nor are there any water developments in the vicinity. If the area were used for sheep bedding, a slight possibility of disturbance of the stone cairns might result.

Structure damage to the sheds remaining at the Lost Soldier Stage Station would continue to occur as cattle use them for shelter or to rub against.

At the Luman Ranch site, structure damage would also continue from cattle using the buildings for shelter or to rub against. The dugouts present at the site might also collapse if cattle were to stand upon them. Some of the buildings are within fenced enclosures and would not suffer damage.

Proposed Developments

As outlined in Chapter 1, an intensive site specific survey would have to be conducted prior to the construction of improvements to identify cultural resources. This would serve to increase the amount of cultural data available from the Seven Lakes ES area for use in studies and research.

Buried cultural resources as described in Chapter 2 Cultural Resources might be uncovered during construction projects. This would add to the data available on cultural resources in the area; however, all or part of the site may be destroyed as it is uncovered, destroying the resource for use in the future.

Access routes to water developments would provide easier access to previously unopened areas for artifact collectors. Vandalism and relic collection would cause severe loss of cultural data at construction sites because of increased human activity.

Summary of Impacts

An increase in livestock use under the proposed action would generally increase trampling impacts to archeological sites associated with hunting, gathering and camping activities in the Ferris and Stewart Creek allotments, but decrease them in the Cyclone Rim allotment. Elimination of unauthorized cattle drift into the Cyclone Rim and Stewart Creek allotments under the proposed action would lessen trampling impacts in these two allotments, particularly in the Lost Creek drainage. In general, summer grazing (treatments A, B, and D) would increase the chances of damage to artifacts around water sources and where the soil is wet. Under winter grazing (treatment C), a minimal impact would result from grazing. Trampling impacts to sites around exisiting water sources would be reduced under the proposed action with the construction of 35 new water developments. These new water sources would distribute livestock use so that even with the increased AUMs under the proposed action, trampling impacts of the present situation could be reduced. However, new areas of impact to cultural resources, from trampling, could be expected for a 5 acre area around each new water development, with damage inversely proportional to the distance from the water source.

New sheep bed grounds, regardless of season of use, would severely impact cultural resources, if present, at the location.

Construction of new water developments could cause severe subsurface disturbance of cultural material. Human activity around the construction of sites would lead to vandalism, causing a severe loss of information. The development of two-track vehicle trails for access to water developments (1 mile) would cause a moderate impact to surface sites. Crooks Creek Medicine Wheel could be minimally impacted by livestock use.

None of the 40 known archeological sites in the Seven Lakes ES area would be impacted by range improvements or by concentrated trampling.

Structure damage would continue to occur to buildings at the Lost Soldier Stage Station Site and the Luman Ranch Site from livestock using the buildings for shelter or to rub against.

IMPACTS ON VISUAL RESOURCES

Table 3-10 displays the results of analyzing visual impacts generated by the proposed action (for methodology, see Appendix B-2-6). The analysis of the visual impacts was accomplished by isolating the "worst-case" in a landscape type for each proposed range improvement or combination of proposed improvements. If the "worst-case" was found to be within the objectives for the visual resource, it was presumed that all other cases would be within acceptable limits. If the "worst-case" was not within acceptable limits, the next "worst-case" was examined until a case within the acceptable limits was found.

The approach taken in this analysis is to recognize that any change to the landscape would constitute a visual impact. The impact evaluation (Table 3-10) considers four degrees of impact. They would be slight, moderate, high, and a class change. The reader should note that the proposed action would occur in predominantly Visual Resource Management (VRM) Class IV (see Map 2-18).

According to the VRM Contrast Rating system, Class IV areas are the most tolerant to visual change. The analysis concluded that the proposed action would not cause a reduction in VRM Class from the impacts assessed below.

There would be impacts from the "sky lining" of 6.5 miles of fence between the Stewart Creek/Ferris allotments and approximately 18 miles of fence along the Cyclone Rim/Stewart Creek allotment and the Green Mountain allotment boundary. Three well projects (Hadsell Spring vicinity, Sooner Reservoir vicinity, and Bairoil vicinity) may cause "sky lining" in their proposed locations. The remaining visual intrusion, categorically, would be the metallic structures. These structures would be left in their galvanized condition which would contrast with the landscape.

IMPACTS ON RECREATION

Range Improvements

Fences

The proposed action calls for the construction of 44.1 miles of allotment boundary fence and installation of four cattleguards on major travel routes. Cattleguards would not be placed on the unimproved routes or seismic lines which are occasionally used by recreationists. The absence of these cattleguards on the unimproved routes would restrict access and in turn affect use patterns. Hunters would experience the greatest impact from the proposed action. Having occasionally to detour through gates would be more of a minor annoyance than an impact, however. The significance of this short and long-term annoyance would be slight.

Water Development

It has been predicted (Animals Chapter 3) that seasonal pronghorn distributions would be altered with the development of additional water sources in the ES area. The effect of the water developments would be to increase the populations during mid and late summer. Hunting in the ES area would increase accordingly while hunting in areas to the south of the ES area would decrease. Hunting pronghorn in the region would be unaffected by the proposed action. The magnitude of the pronghorn hunting increase in the ES area would be

ALLOTMENT	VRM CLASS	PROPOSED ACTION		ELEMENTS	FEATURES (WEIGHTED SCORE)															IMPACT EVALUATION *
					LAND SURFACE					VEGETATION					STRUCTURES					
					FORM	LINE	COLOR	TEXTURE	TOTAL	FORM	LINE	COLOR	TEXTURE	TOTAL	FORM	LINE	COLOR	TEXTURE	TOTAL	
FERRIS	IV	FENCING	TYPE - 1								3			3		3			3	Slight
			LET DOWN								3			3		3			3	Slight
			RIPARIAN																	
			RESERVOIR								3	2		5		3			3	Slight
		WATER	WELLS								3	2		5	8	3			11	Slight
			SPRINGS																	
			RESERVOIR		8		2	2	12	4	3	2	1	10						Slight
		TWO TRACK TRAILS				6	3		9	9				9						Slight
		CATTLEGUARDS													4	3			7	Slight
STEWART CREEK	IV	FENCING	TYPE - 1								3			3		3			3	Slight
	III		LET DOWN								3			3		3			3	Slight
	IV		RIPARIAN																	
			RESERVOIR								3	2		5		3			3	Slight
		WATER	WELLS								3	2		5	8	3			11	Slight
			SPRINGS																	
			RESERVOIR																	
		TWO TRACK TRAILS				6	3		9		9			9						Slight
	III	CATTLEGUARDS													4	3			7	Slight
CYCLONE RIM	IV	FENCING	TYPE - 1									3		3		3			3	Slight
	III		LET DOWN									3		3		3			3	Slight
	IV		RIPARIAN																	
			RESERVOIR																	
		WATER	WELLS								3	2		5	8	3			11	Slight
			SPRINGS												4	3			7	Slight
			RESERVOIR																	
		TWO TRACK TRAILS				6	3		9		8			9						Slight

* These impacts are evaluated in the middleground only.
The degree of impact is not sufficient to warrant
significant change to the proposals.

TABLE 3 - 10

VISUAL CONTRAST RATING SUMMARY

35% or 300 recreation days in both the short and long term. The numerical increase in recreation days would be from 832 to 1,132 in the short term and 906 to 1,206 by the long term. Sage grouse hunting would remain unchanged from the present situation.

With the exception of hunting, recreation activities in the ES area would be virtually unaffected by implementation of the proposed action.

IMPACTS TO WILDERNESS

Although the potential for establishing wilderness areas in the ES area is not presently known, impacts listed here would result if the proposed action was implemented in an area with wilderness potential. Such impacts to potential wilderness would result from the construction of fences, access roads, and water developments. Impacts would be in the form of scars on the landscape due to construction activities. Visual impacts would result from the appearance of man-made features that would change the wilderness character of the area. These impacts would occur in the short term, but would be of long-term duration. However, if any area within the ES area is identified as having wilderness potential and is formally identifed as a wilderness study area, implementation of any part of the proposed action in that area which would change its wilderness character would be deferred. If such an area was established as a wilderness area, the deferment would be permanent; if not, the proposed action would ultimately be completely implemented.

IMPACTS ON LIVESTOCK GRAZING

Ferris Allotment—(Two-pasture deferred cattle rotation system with winterlong sheep grazing.)

Winter Sheep

The proposed action would reduce the licensed winter sheep animal unit months (AUMs) 27.5% (from 5,464 to 3,882 AUMs) when implemented in the Ferris allotment. The proposed action would also allow one operator to convert one-half of his winter sheep grazing privileges to summer cattle privileges (371 winter sheep AUMs to 179 summer cattle AUMs).

The winter sheep grazing season would be shortened 45 days (23%). Therefore, the livestock operators would be dependent on other lands outside the ES area for 45 additional days each year. In the event existing other lands that operators own, rent, or lease were not capable of supporting the increased number of sheep for 45 days, some operators would probably have to buy, rent, or lease additional pasture.

The proposed action would also eliminate the persistent licensed nonuse of winter sheep which has occurred at an average rate of 40% (Table 1-1) over the 5 years in the Ferris allotment. Total active winter sheep use in the Ferris allotment would be 3,882 AUMs annually at implementation. This increase of active winter sheep use at implementation through the short term would have impacts upon vegetation and socioecomonic elements.

No sheep operator would be allowed to use the same bed ground more than once in a grazing season, and the bed grounds would be moved at least 1.5 miles every 7 days. This should lessen the concentration of sheep around favored bed grounds and achieve a better distribution of grazing, thus enhancing the vegetation over the long term.

An additional 2,616 acres would be made suitable for winter sheep grazing due to production increases resulting from the grazing system (Table 2-36).

Summer Cattle

Like the winter sheep operators, the two existing cattle operators in the Ferris allotment would receive a 27.5% reduction in their AUMs upon implementation of the proposed action. The reduction in AUMs, however, would have only slight impacts on the operators.

The proposed action would also permit one sheep operator to convert 371 winter sheep AUMs to 179 summer cattle AUMs. Therefore, summer cattle use in the Ferris allotment would change from 341 to 426 federal AUMs (341 AUMs x .725 179 AUMs). However, with the proposed water developments for better grazing distribution, and with the two-pasture deferred-grazing system for cattle, improved range vigor and condition would result in improved livestock forage production and vegetation condition as shown in Tables 3-6 and 3-7, respectively.

Although moving the cattle August 1st from one pasture to the other would result in temporarily reduced weight gains until the cattle adjust to their new range, cattle would be limited to an area approximately one-half the size of the area they can now roam. This should increase the probability of a cow being bred, thus increasing the birth rate an estimated 5%, and also should decrease labor costs associated with the cattle operations.

Herding the cattle to keep them in the scheduled pasture would add costs to the operators. Herding the cattle would require one person on horseback to watch the cattle on a full-time basis, although this person would be able to do at least part of the herding required in the Stewart Creek allotment as well.

The proposed water developments would lead to increased weight gains because the cattle would spend less time and energy traveling to and from water. The proposed fences on the western allotment boundary would restrict the cattle, forcing a more uniform utilization of the range. The fences would also simplify gathering operations in the fall, and range administration by the BLM by eliminating an estimated 80% of the existing cattle drift into and out of the Ferris allotment.

Under the proposed action, the grazing season would be shortened; this would not impact the operators because they have other ample sources of grazing for the few (98) head of cattle involved. The Ferris allotment also would no longer be used merely as a gathering place for cattle in the fall, but with the proposed grazing system, would support cattle throughout the cattle grazing season. This would alter the traditional use of the operators (Table 3-11).

An additional 3,434 acres would be made suitable for grazing by cattle during the summer (Table 2-36). This increase in suitable acres would result from forage production increases brought about by the grazing systems.

Stewart Creek Allotment—(Three-pasture deferred-rotation summer cattle grazing with winter-long sheep use in two pastures.)

Winter Sheep

Winter sheep use in the Stewart Creek allotment would change slightly because of the proposed action. Both winter sheep operators would receive an initial 8.21% reduction in their authorized AUMs (from 6,718 to 6,166 AUMs). The operators would be required to move their bed grounds at least 1.5 miles every week, their season of use would be shortened to be from November 1 until March 31, and if an operator failed to make significant active use of his privileges, he could lose them. The basic impact to the operators would be more stringent and controlled management (see Socioeconomic Condition section) as well as a slight AUM reduction.

Overall, the proposed action would not change the production of sheep significantly in the short term. The improved distribution of grazing would, however, lead to an estimated 5% increase in sheep production by the long term because of the predicted vegetative increases.

Summer Cattle

The 8.21% (in terms of winter sheep AUMs) reduction would impact the operators by lowering the value of their base property to which the federal grazing privileges were attached over the short term, and by reducing the number of animal units they can graze on federal range in the ES area.

The proposed action in the Stewart Creek allotment would not change the performance of individual animals, but should increase the number of animals (from 577 to 1,125 head) by full implementation. Depending on the weather in a given year and the forage produced, nursing calves under the proposed action would gain approximately 1.25 pounds per day, and yearlings would average 1.5 pounds per day over the summer grazing season (personal communication, Dr. Kercher 1977). Slight increases in forage by the long term would account for approximately a 5% increase in cattle AUMs by the long term.

The proposed action would enable three livestock operators to convert 5,206 winter sheep AUMs to 2,697 summer cattle AUMs as the water developments become operational. In effect, the proposed action would improve the economic viability of these operators. It would also eliminate the extensive (22.9%) nonuse which has been taken in the area over the past 7 years.

The proposed water developments would enable the cattle to graze the entire allotment, making an additional 4,565 summer cattle AUMs available. This would allow increases in cattle numbers, leading to an increased income potential for the operators.

The proposed water developments would make an additional 59,609 acres suitable for summer grazing by cattle. The proposed grazing system would increase forage production on 18,883 acres that are presently not suitable for cattle grazing due to low forage production. The production increases would make this acreage suitable for summer grazing by cattle.

Additional herding efforts would be needed to keep the cattle within the allotment; otherwise some drift would be expected into the checkerboard lands to the south.

The cattle in the Stewart Creek allotment could drift across the Crooks Gap-Wamsutter Road into the Cyclone Rim allotment; according to at least one livestock operator in the ES area, this drift would be difficult to control especially during inclement weather without fencing. The impact would be increased and unquantifiable herding costs. Operators could be subject to trespass action by the BLM.

In the proposed Stewart Creek allotment, approximately 29 miles of checkerboard boundary would not be fenced or marked with pasture boundary signs. Since no man-made or topographic features delineate this boundary, the cattle operators would encounter problems keeping their stock in the allotment and preventing them from straying across the line. These problems would be compounded by the fact that a number of water sources including an artesian well and numerous small lakes are found just outside the allotment and cattle would be attracted to these waters. This would lead to increased herding costs.

Fencing the northern boundary of the ES area would prevent cattle from the Green Mountain and proposed Arapahoe Creek allotments from drifting into the ES area. Cattle drift into the existing Seven Lakes incommon allotment from the Green Mountain allotment is presently estimated by BLM range conservationists in the Divide Resource Area as being used 30% (3,077 AUMs) above the authorized cattle use (authorized cattle use is 10,256 AUMs) and of the unauthorized use, 40% or 1,231 AUMs are estimated to be in the ES area. With the drift eliminated, forage would be saved for the use of the livestock operators authorized to graze in the ES area.

Fencing the northern boundary of the ES area would exclude Lander area livestock operations from grazing areas primarily in the Cyclone Rim allotment which these operations have traditionally used for nearly 100 years.

The range improvement projects proposed would improve the distribution of cattle grazing. Nevertheless, it is possible that cattle could become entrapped by a fence or congregate and stay around a water development in a

TABLE 3-11
COMPARISON OF PRESENT, PROPOSED, AND PREDICTED (BY 1998) LIVESTOCK USE

Allotment	Present Production (AUMs) of Forage (Winter Sheep AUMs)	Present Licensed Use* (AUMs by Class)	Predicted Production (AUMs by 1998) of Forage (Winter Sheep AUMs)	Proposed Use at Implementation (Winter Sheep AUMs)	Predicted Use in 1998 (Winter sheep AUMs)**	Present Season of Use	Proposed Season of Use
Ferris	5,625		6,314				
Sheep AUMs		5,755		3,882	4,348	10/15-4/30	11/1-3/31
Cattle AUMs		470		1,013	1,135	5/1-11/30	5/15-10/15
Stewart Creek	19,710		21.704				
Sheep AUMs		13,837		6,166	6,721	3/1-2/28	11/1-3/31
Cattle AUMs		3,104		10.260	11,183	5/1-12/31	5/20-10/31
Cyclone Rim	35,285	35,333	36,689				
Sheep AUMs				25,644	26,670	3/1-2/28	11/1-3/31 and 5/1-7/15
Cattle AUMs		188		7,904	8,220	5/1-12/31	10/1-3/31
TOTALS	60,620	58,687	64,707	54,869	58,277		

*The Stewart Creek and Cyclone Rim allotments are presently combined, forming a portion of the existing Seven Lakes incommon allotment. For comparison purposes only, the present licensed AUMs of the operators in the Seven Lakes incommon allotment, who would be included in the proposed action, were split on the basis of which allotment in the proposed action (either Stewart Creek or Cyclone Rim) the operator's use would be licensed.

**In order to put all predicted livestock use into terms of winter sheep AUMs, the conversion factors of 2.07 sheep to 1.00 cattle AUMs in the Ferris allotment; 1.71 sheep to 1.00 cattle AUMs in the Stewart Creek allotment; and 1.41 sheep to 1.00 cattle AUMs in the Cyclone Rim allotment were used (see Appendix B-1-1).

deferred pasture. However, the proposed herding in the ES area should prevent most problems of this nature because the cattle would be more closely monitored.

Ear tagging the cattle for identification of ownership would not measurably impact the operators because the tags would be supplied by BLM, and most cattle are currently run through a chute at least once annually. Tagging would add only a few seconds time spent with each animal.

Livestock operations both in and north of the ES area should benefit by the fencing proposed because their cattle would be confined in a smaller area than presently. Nevertheless, the fact that the let-down fences are proposed to be lowered while cattle are still grazing the allotment negates a portion of the purpose of the fencing. An early autumn storm could scatter cattle completely over the ES area if the fences were let down before the cattle were removed from the allotments proposed in the ES area and from the cattle grazing allotments north of the ES area. This would cause increased herding costs, trespass fines, and lost cattle.

Cyclone Rim Allotment—(Discontinuous winter sheep and cattle grazing with summer sheep use.)

Winter Sheep

The Cyclone Rim allotment is a traditional grazing area for winter sheep. The proposed action would change the present use only slightly by requiring each bed ground to be moved at least 3 miles every 7 days, but the operators are required only to stay 3 miles away from their own bed grounds, not each others'. Therefore, favored bed grounds could continue to be heavily used and deteriorate throughout the long term. Nevertheless, by the long term (1998), the proposed action should result in improved forage conditions and increased livestock production due to the better distribution of grazing. The operators would continue to herd their sheep and should not sustain additional costs. A 4% increase in winter sheep AUMs would occur by 1998. The livestock operators would receive a like increase in their AUMs.

Winter Cattle

Range cattle require flowing water during the winter to prevent weight loss unless they are fed supplements. Ingesting snow uses up calories needed to maintain their body temperature. This energy is provided by carbohydrates and fats (Stoddart, Smith, and Box 1975). Without supplemental feed to replace the energy used, the animal would be required to utilize its own body reserves. This would cause a decrease in body weight, depending on weather, forage, and livestock conditions. Winter yearlings during an "average or mild" winter would gain 25 to 50 pounds during the season without supplemental feeding. Supplemental feeding of 1 to 2 pounds per day would cause gains on winter yearlings of 75 pounds during the season (personal communication, Dr. Kercher 1977). It is assumed the operator would do some supplemental feeding. Nevertheless, during a normal year, cows could be carried over in this allotment in good enough shape to produce calves in late spring. Yearling cattle would begin to gain weight after the winter grazing period.

The proposed water developments would make an additional 149,416 acres (Table 2-36) suitable for winter grazing by cattle, according to BLM suitability standards (Appendix B-1-4). However, the allotment would be marginally suited for winter cattle use because of unpredictable winter weather. The winter conditions would add problems of providing supplemental feed and keeping water developments open for the cattle.

Summer Sheep

An additional 1,304 acres would be made suitable for summer grazing by sheep as a result of completing the proposed water developments. An additional 3,076 acres would be made suitable for summer grazing by sheep due to increased forage production resulting from the proposed grazing systems.

Under the proposed action, one operator would continue to run one band of sheep in the Cyclone Rim pasture in spring and early summer, although the proposed action would delay the start of his use by about 30 days. (His use is proposed to be 918 summer sheep AUMs between May 1 and July 15—this would amount to 1,836 head.) Like all livestock operators in the Cyclone Rim and Stewart Creek allotments, this operator's grazing privileges would be reduced 8.21% if the proposed action is implemented.

Impact Summary

The impacts of the proposed action to livestock operators would be an initial reduction in AUMs, coupled with elimination of the substantial nonuse, meaning that there would be a net increase in the number of livestock run. Sheep and cattle operations would be more tightly controlled, something the operators would resent, although they admit a need for better management in the area. Required cattle herding would add costs to the operators, but the water developments would increase the area suitable for grazing by approximately 210,000 acres, and the proposed grazing systems would increase the area suitable for grazing by approximately 20,000 acres. Overall, a slight increase in livestock production in the Seven Lakes ES area would occur due to increased vegetative production and improved management by the long term.

IMPACTS ON TRANSPORATION

The proposed action would create no impacts on traffic movement patterns in the Seven Lakes ES area on the principal road network. All major roads (Wamsutter-

Crooks Gap, Bairoil, Hadsell, etc.) would be equipped with cattleguards at fence crossings, thus elminating the need for gates.

Impacts to the unrestricted movement of vehicles on seismograph lines or other undeveloped trails could result where fences crossed such roads and trails. The impacts would be that recreationists or mineral exploration personnel would be required to detour through gates in the event that their route of travel on, for example, a seismograph line crossed a fence with no gate. Damage to fences could result due to unwillingness on the part of some people to detour through gates. These impacts would originate in the short term and continue into the long-term period.

IMPACTS ON SOCIOECONOMIC CONDITIONS

The following analysis focuses on income, employment, public finance, social well-being, and socio-cultural attitudes as they relate to the proposed action of this ES. The analysis covers the ES area and the livestock operations therein to the extent that available information allows. Published data were used to simulate the livestock income situation in the area (Stevens 1975 and Gee 1975). This method was chosen because data for entire individual ranch operations were not available. The analysis of income then, is most meaningful when applied to the ES area as a whole rather than to an individual ranch operation.

Level of Authorized Livestock Grazing

In order to make a comparison between the proposed action and the present situation which is most realistic, the present situation (for the purposes of the economic analysis) is defined as a continuation of the average active level of livestock use which has occurred over the years 1972-1976. This will allow a comparison of income generated by livestock operations over the previous 5 years with income which would be generated under the proposed action.

Income

Livestock, construction, and recreation (hunting) income which would result from the proposed action were estimated for each allotment in the ES area. Construction income would be generated through implementation of water development, fencing, and other impacts. Recreation (hunting) income figures were included because they too would be slightly affected by the proposed action. A summary of livestock and hunting income is shown in Table 3-12 for the years 1986 and 1998. Construction income would have been generated between the years 1978 and 1982 and would equal approximately $600,000. Under the present situation, total income would be approximately $319,827 per year. The primary reason that income is higher under the proposed action than under the present situtation is that licensed livestock forage would be fully utilized. In other words, nonuse would be eliminated. The methodology for the income section can be found in Appendix B-3-7.

The total regional income effect can be estimated using income multipliers from BLM's Socioeconomic Data System. The multiplier effect would produce a total of $1,111,484, in the short term and $1,174,547 in the long term not including construction income or wild horse values. Income from hunting activities would largely be spent in the retail sector, while income from livestock and construction would to a somewhat greater extent be felt in the overall economy.

ES area income associated with the proposed action as a percent of total regional income is an insignificant amount. In the long term (1998) ES area income resulting from the proposed action would be a significantly smaller percent of total regional income than at present due to the rapid, large-scale growth of the energy mineral industry.

Wild horse values were calculated for the ES area using the methodology shown in Appendix B-3-7. That value is equal to $6,906 for the short term and $6,906 for the long term.

Income from livestock and hunting activities was calculated for each year of the 20-year analysis period, discounted at 6 5/8% to present value, and summed. The total income using this method is $7,573,173 for the proposed action. Under the present situation, income calculated with the above method is equal to $3,954,961.

The ES area livestock operators could feel the effects of the proposed action in several ways in terms of income. One option available to individual operators would be to activate all grazing privileges. Some operators would likely take this option. By activating all available livestock forage, income should be increased, assuming that the previously presented data would apply (Stevens 1975 and Gee 1975). Another option would be for a livestock operator to lease the base property to which federal grazing privileges are attached to another operator who would use the privileges. The owner in this case retains control of his federal grazing privileges and derives some income from them. Another option would be to sell base property (the attached grazing privileges would presumably accompany the base property). The buyer, presumably a large operator, would activate the grazing privileges. A final option available to the operator would be to do nothing. Presumably in this case, if the federal livestock forage was not activated, it could be offered by BLM to any operator who wished to activate it, at least on a one-or-more year nonrenewable basis. In this case, an operator unable or unwilling to activate his grazing privileges could conceivably lose them. It is not possible to predict with certainty, which or how many of the above courses of action would be adopted and by which operators. In a general sense, it could be predicted that by the long term the total number of livestock operators who have Seven Lakes ES grazing privileges would decrease from the present fifteen to approximately seven, the present number of active operators. The remaining operations would have been consolidated with

TABLE 3-12
INCOME ASSOCIATED WITH THE PROPOSED ACTION 1986 AND 1998

Category	Allotment Ferris	 Stewart Creek	 Cyclone Rim	 Total
Income in 1986--Short Term				
Livestock	$58,136	$151,476	$408,807	$618,419
Hunting	24,929	49,859	24,929	99,717
TOTAL	$83,065	$201,335	$433,736	$718,136
Income in 1998--Long Term				
Livestock	$65,088	$166,673	$425,100	$656,861
Hunting	24,929	49,859	24,929	99,717
TOTAL	$90,017	$216,532	$450,029	$756,578

Source: See methodology in Appendix B-3-7.

larger, more viable operations. The seven operators, basically all large operations, would realize the bulk of the direct livestock income over the 20-year analysis period. The remaining eight operators would have realized income from leases or sales of ranch property.

As mentioned above, the bulk of the increase in livestock income would result, under the proposed action, from the activation of presently inactive livestock forage. The large operators would, in all probability, realize the bulk of that increase. This would be the case because the large operator would be able to activate the livestock forage much easier than small or inactive livestock operations. Income realized by small or inactive operations would, as indicated above, result primarily from leases or sales of ranch property.

As indicated in the livestock grazing section the proposed action calls for herding of both sheep and cattle to adhere to the grazing systems. This would add additional costs to the individual ranch operations. It would be difficult to place a dollar figure on the additional herding (or labor) requirements but this could tend to negate some of the income benefits associated with the proposed action. Since some herding and close monitoring of livestock is an integral part of any normal livestock operation it is not possible to predict how much additional labor would be required by the proposed action.

Employment

Impacts from the proposed action on employment would be of two types. First, construction employment would be generated during the implementation stages of the allotment management plans. Second, employment would be generated by the increased levels of livestock grazing use. Employment generated by construction activities would amount to approximately 10 man equivalents. This figure is based on experience with previous BLM range improvement projects in the Rawlins District.

Employment generated by livestock grazing in the ES area under the proposed action would amount to 19 man equivalents in the short term. Employment in the long term would be equal to or 5% higher than the above (see Appendix B-3-7 for methodology).

Employment under the present situation generated by livestock operations would equal 9 man equivalents. This figure is based on average active use over the previous 5 years. The increase in employment over the present situation would be due to activation of presently inactive livestock forage.

The employment impacts described above would be insignificant on a regional basis in the short term. Long-term effects on a regional basis would be even less due to dramatic increases in employment forcasted for other sectors of the economy.

Jobs as ranch hands and herders in the sheep industry typically have been occupied to a large degree by minorities, usually of Spanish-American descent. The change in class of livestock allowed by the proposed action would not have any adverse effect on minority employment. The proposed action would, in fact, increase employment opportunities in both the sheep and cattle industries by a slight amount.

Rancher Flexibility

The proposed action would allow the operators who use the Seven Lakes ES area for livestock grazing to change class of livestock. Present requests involve changing from sheep to cattle use. These requests are being made by the livestock operators because cattle are presently more profitable to run than sheep. Allowing changes in class of livestock gives the rancher the option of choosing the most profitable class of livestock to run. If, for example, running sheep was believed to result in a loss, the operator could convert all or part of his operation to cattle, (as is the present case with six operators). This type of flexibility would allow access to profits which may not be available from the present situation.

Ranch Value and Loan Risk

Implementation of the proposed action would involve initial cuts in total AUMs available to the operators. However, the initial flexibility to change class of livestock coupled with increases in AUMs expected to be licensed in the long term, and the activation of significant numbers of inactive livestock forage, could result in slight overall increases in ranch value for the operators. Furthermore, the operators' ability to finance their operations may be slightly increased because of implementation of the proposed action. First, slight increases in the amount of forage available to livestock operators should be realized by the long term. Slight increases in ranch value would accompany increases in productivity (personal communication, Daniel Clawson, First Vice-President of First Wyoming Bank of Rawlins 1977). Second, the proposed action would facilitate the activation of a large amount of presently inactive livestock forage. Active sheep AUMs would increase by 91% while active cattle AUMs would increase by 490% by the short term. Under the present situation, active livestock use would remain at essentially the same level as the average for the years 1972-1976. Thus, the size of the ES area operations, in terms of active AUMs, would increase. Ranch values would increase accordingly. Larger ranch operations, all things being equal, should have greater borrowing ability than small operations.

Public Finance

The contribution to assessed valuation made by livestock in the ES area would increase under the proposed action. The increase would result from activation of inactive livestock forage and would equal $113,896 by the long term based on 1975 data (see Appendix B-3-7 for methodology).

Wild Horses

As indicated elsewhere, livestock forage would be allocated to wild horses under the proposed action. This represents a loss of forage to the operators, that would otherwise be allocated to livestock. On a winter sheep basis, the value involved would make up less than 1% of total available forage. Impacts to the operators would not be significant.

Social Well-Being

Social well-being is affected by, among other things, income and employment. The proposed action would have essentially no effect on social well-being in the region. The operators who would receive increased income resulting from the proposed action would enjoy slightly increased social well-being. The remainder would probably not be affected although the future of the small inactive operations is too uncertain to make such a prediction. Overall however, the ES area operators would not be significantly affected in terms of social well-being.

Socio-Cultural Attitudes

As reflected in the public participation record for the Seven Lakes MFP, ranchers are in favor of the proposed range improvements, particularly the water developments. The proposed action is not in conflict with this attitude.

Under the proposed action, livestock grazing would continue in the area for at least the duration of the analysis period. It is felt by many that the proposed fencing and water developments would not seriously affect the open space values of the area. Wildlife interests strongly oppose any additional fencing. Fencing is considered by some people to be a serious threat to migratory pronghorn populations in the area.

A prevailing attitude among the ES area operators concerns government interference and regulation of their livestock operations. The proposed action would intensify management of the ES area. Intensified management would mean closer monitoring of livestock on public lands. This is perceived by the ranch operators as a loss of control of their operations and unnecessary federal regulation and interference. Attitudes would likely be negative in both the short and long term toward more federal regulation.

Summary

The proposed action would cause activation of livestock forage which is presently in nonuse. Livestock income would increase significantly to some operators in the ES area as a result. A minor amount of construction income would be generated during the implementation stages. Recreation income would increase slightly under the proposed action. Due to the fact that forage would be allocated for them, income would be attributed to wild horses through the opportunity cost approach.

The proposed action would allow ranch operators to change class of livestock as outlined in Chapter 1. This increased flexibility would allow the operators access to income which is not at present available.

With or without the proposed action, it is likely that by 1998, the total number of livestock operators in the ES area will be fewer than at present. By requiring the activation of all available livestock forage, the proposed action could have an accelerating effect on this process.

Employment would be slightly affected by the proposed action. Additional employment generated by the proposed action would be largely felt in the construction industry (10 man equivalents) and the livestock industry (10 man equivalents). Minority employment would be virtually unaffected.

Ranch value could increase by the long term compared to the short term if ES area productivity increases. Increased ranch operator flexibility could increase the viability of the operations.

The contribution to total assessed valuation in the three county region would increase. This increase would not however, be significant.

Social well-being and socio-cultural attitudes would not be significantly affected by the proposed action. Impacts in this area would be minor and very difficult to predict accurately.

Overall, the socioeconomic impacts associated with the proposed action would be localized and minor. None of the socioeconomic patterns in the region would be affected by a noticeable amount. The only impacts of any consequence in the area itself would be income generated by the activation of presently inactive livestock use of the area. It is still important to understand, that the operators could activate the AUMS with or without the proposed action. Activation is most likely however, to occur under the proposed action.

IMPACT SUMMARY

The impacts due to implementation of the proposed action are summarized in Table 3-13. Present conditions are compared with the long-term cumulative impacts. Where impacts are not quantifiable, relative changes are shown.

TABLE 3-13

LONG TERM IMPACTS OF IMPLEMENTING THE PROPOSED ACTION

RESOURCE	ELEMENTS	CAUSE FOR CHANGE	EXISTING CONDITION	LONG TERM CONDITION[1]	AMOUNT OF CHANGE[2]
Water	Consumption and evaporation	Construction of water wells and spring; elimination of nonuse; grazing systems.	87 acre-feet of water per year	107 acre-feet of water per year	+20 acre-feet per year
	Runoff	Grazing systems and range improvements	345 acre-feet of runoff during a 10-year storm	266 acre-feet of runoff from 10-year storm	-79 acre-feet of runoff
	Quality	Grazing systems resulting increase in cover, leading to unquantifiable decreased sediment yield and decreased salinity	Suitable for livestock and wildlife use.	Decreased sediment yield and decreased salinity	Slight increase
Vegetation	Forage production in winter sheep AUMs	Grazing systems	60,620	59,707	+ 4,087
	Range condition in acres	Grazing systems and improvements			
	Poor		4,305	3,758	- 547
	Fair		96,296	74,671	-21,625
	Good		357,712	302,029	-55,683
	Excellent		49,350	127,205	+77,855
Animals	Pronghorn	Grazing system	--	18,125 acres improved spring-summer condition classes; 10,323 acres winter range degraded.	+18,125
		Fencing	No risk	Risk to substantial but unquantifiable numbers	Unknown
		Water developments	1,905 summer pronghorn	2,205 to 2,705 summer pronghorn	+300 to 800
	Mule Deer	Grazing systems	--	Improved spring-summer condition, no change in condition class	--

TABLE 3-13 (CONTINUED)
LONG TERM IMPACTS OF IMPLEMENTING THE PROPOSED ACTION

RESOURCE	ELEMENTS	CAUSE FOR CHANGE	EXISTING CONDITION	LONG TERM CONDITION[1]	AMOUNT OF CHANGE[2]
	Mule Deer	Water developments	175 deer	175+ deer	Slight increase
	Sage grouse	Grazing systems	850 to 1,200 grouse	Slight increase grouse	Slight increase
	Waterfowl	Reservoir fencing	40 nesting pairs	45 to 50 nesting pairs	+5 to 10
	Aquatic	Proposed action	106 trout per mile	106 trout per mile	No change
Wild Horses	Wild, free-roaming behavior	Proposed fencing Controlled water developments	Unrestricted Unrestricted	Some restrictions Some restrictions	Slight Slight
Cultural Resources[3]	Archeological resources	Livestock trampling Range improvements	Severe in places Severe in places	Severe in places Severe in places	More areas of impact More areas of impact
Recreation	Hunter days	Increase in pronghorn numbers due to water developments	915 hunter days yearly	2,095 hunter days yearly	+300 hunter days yearly[6]
Livestock	Unlicensed use by drift	Fencing	1,231 AUMs of trespass	None	-1,231 AUMs of trespass
	Cost of herding to operators	Allotment and pasture boundaries	-Slight	-Low	-Low
	Licensed use Acreage suitable for livestock grazing	Grazing systems Grazing systems; construction of water developments	58,687[4] 220,000	58,277[5] 450,000	- 410 AUMs +230,000
Socioeconomic	Revenue of proposed action	Activation of nonuse; hunting.	$ 319,827	$756,578	+$436,751

FOOTNOTES FOR TABLE 3-13

1 Where magnitude of adverse (-) or beneficial (+) impact is unknown, the following ranges are used:
Slight = 0%-10%
Low = 11%-30%
Moderate = 31%-75%
Severe = 76% or more

2 Changes (+) or (-) in this column do not denote adverse or beneficial changes--only the change in the measurement of particular impacts.

3 This level of change would occur around range improvements and in trampled areas on cultural resources not identified during the preconstruction survey. These percentages do not indicate these intensities of impacts area wide. For a quantification of low (minimal) and severe impacts in terms of cultural resources, see the Cultural Resources narrative, Chapter 3.

4 58,687 AUMs is the total of the present federal, state, and private qualifications (active and nonuse) of the livestock operators, who would be authorized to use the ES area upon implementation of the proposed action.

5 Predicted use in 1998 expressed in winter sheep AUMs. The level of use for the proposed action is 54,869 winter sheep AUMs upon full implementation of AMPs.

6 300 Hunter days are attributable to the proposed action. The remainder of the increase in hunter days would occur under the present situation.

CHAPTER 4

MITIGATING MEASURES NOT INCLUDED IN THE PROPOSED ACTION

MEASURES

The Bureau of Land Management (BLM) will carry out or enforce the following measures if the proposed action were to be implemented. These measures are designed to eliminate or reduce the adverse impacts identified in Chapter 3. It is assumed that the existing and proposed improvements would be maintained, as outlined in Chapter 1. Each measure is tied to an already identified impact and will be analyzed as to its effectiveness in reducing the impact. The mitigating measures are addressed by components of the proposed action over the long term and are in a numerical sequence. Following this is an analysis of the effectiveness of each mitigating measure. A tabular summary lists impacts (Chapter 3) by resource, mitigating measures (referred to by number), and the residual impact. Monitoring, research and study programs are discussed at the end of the chapter.

Administrative Actions (AMPs)

1. Critical wells will be left on during the summer grazing season (May 1-October 15) even though the pasture is being deferred. The BLM will conduct a study to determine which wells are of critical use to wildlife and wild horses (see Monitoring section).

If wells, upon which wildlife and wild horses have become dependent, are turned off, the wildlife and wild horses would be impacted by a reduction in habitat. The animals would be forced to move to a new water source.

2. Cultural resource inventories will be conducted in areas of livestock concentrations, such as existing watering points, draws and other protected areas. Any cultural resource identifed during these inventories which are determined to be eligible for nomination to the National Register will be evaluated for possible impacts from grazing and appropriate action taken per 36 CFR 800 in consultation with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation.

This mitigation is necessary to alleviate the impact of livestock trampling or abrasion upon significant cultural resources and to prevent the loss of significant cultural values through neglect. This mitigation will not apply to sheep bed grounds since their locations cannot be determined prior to disturbance.

3. The bands of sheep grazed during the early summer (May 1-July 15) proposed for the Cyclone pasture of the Cyclone Rim allotment will be required in odd numbered years to start grazing the pasture from the southeastern corner, and in even numbered years to turnout near the northwestern corner.

The early grazing would result in a loss of vegetative vigor and production. The mitigation should prevent damage caused by grazing the same part of the pasture at the same time during the critical early growth period every year.

4. Type 1 fencing will be constructed, as described in the habitat management plan (HMP), in the Ferris allotment on Lost Soldier Creek on 9 acres upstream and 14 acres downstream from the Twin Buttes Road, and on 29 acres of Sand Spring in the Stewart Creek allotment to exclude livestock use from these riparian areas.

Concentrated livestock use on these riparian areas is reducing nesting habitat for waterfowl, sage grouse, and nongame birds by reducing vegetative cover. Nest trampling would also be expected to occur.

Concentrated livestock use on these areas may also reduce the quality of aquatic habitat through the consumption and trampling of streamside vegetation and increasing sediment yields by streambank disturbance.

5. Any given sheep bed ground will be permitted to be grazed only one 7-day period during one grazing season.

Allowing sheep bed grounds to be grazed more than one 7-day period in one grazing season would cause a decrease in plant vigor, seed production, litter accumulation, and seedling establishment. The mitigation should prevent damage caused by concentrated sheep use on sheep bed grounds in the entire ES area.

6. The BLM will stipulate in licensing sheep use in the Sand Springs pasture of the Stewart Creek allotment that sheep bedding will be excluded from an area for a radius of ¼ mile surrounding the Crooks Creek Medicine Wheel.

Sheep bedding at the Crooks Creek Medicine Wheel could adversely impact this National Register eligible property by disturbing the stone cairns.

Range Improvements

Fences

7. Areas enclosed by a BLM Type 1 fence around water developments and the spring development in which construction of range improvement projects would remove the topsoil and perennial vegetation will be reseeded with suitable and available vegetative species. Reseeding will be repeated until a successful stand (which will be defined as vegetative cover equal to the

surrounding area) is established. The number of reseedings would be dependent upon soil condition and climatic conditions.

Lack of vegetative cover on a disturbed site increases the probability of invasion by undesirable vegetative species and also increases the potential erosion for that site.

8. The let-down date of the proposed 27.8 miles of let-down fences will be advanced from October 20 to October 1. The BLM will let the fence down.

By letting down the fence on October 1, there would be less chance of a substantial but unquantifiable number of migrating pronghorn being caught by a severe early winter snow storm, being trapped by the fencing, and being killed.

9. The proposed .25 miles Type 1 fence at Bull Springs (between Bull Springs and Stewart Creek allotment) will be changed to a let-down fence with an October 1 let-down and May 20 put-up date. The BLM will let the fence down.

By changing from a Type 1 fence to a let-down fence, it would be possible for pronghorn to migrate across the Bull Springs area more easily, thus reducing the chance of stress-caused mortality.

10. Proposed Type 1 and let-down fences will be modified with the addition of flagging or flashers to the top wire or a wooden top rail on lengths of the fence if and where future studies determine wild horses are being injured by running into the fence.

The impact on the horses resulting from colliding with Type 1 and let-down fences would consist of injury or death of individual horses. Losses without mitigation would probably not exceed five horses per year.

11. All fences, where possible, will be located on the windward side of ridges rather than on ridge tops.

A fence located on a ridgetop could be a visual intrusion.

12. All water development structures (e.g., storage tanks, windmills, or troughs) will be colored earthtone colors so as not to contrast with the natural landscape.

Unpainted metal surfaces could be visual intrusions.

13. Water wells will be designed to pump a limited quantity of water so that overflow pit capacities are not exceeded.

If wells were allowed to run continuously, produced water might overflow the overflow pits. This would create new drainages, loss of water, and channel cutting, thus creating erosion problems.

14. Some 499 additional AUMs of winter sheep forage will be reserved for wild horses (see Appendix B-3-6).

If the additional AUMs are not made available, the allotments would be slightly overgrazed, leading to deterioration of the vegetation.

ANALYSIS OF EFFECTIVENESS

1. Turning off water wells during the summer could force wild horses and pronghorn to seek other water, altering their natural behavior, and reducing their habitat. Moving to another water source could force them into increased competition with livestock.

Mitigating measure 1 will be applied to this impact.

Leaving critical water sources turned on during the summer (a consumption of less than 1 acre foot) would mitigate this impact 100%, with no impact on water resources.

2. Livestock trampling on significant cultural resources could damage or destroy the scientific and human interest values of the resource.

Mitigating measure 2 will be applied to this impact.

The development of appropriate actions in consultation with the SHPO and Advisory Council through 36 CFR 800 would establish specific mitigating measures which would provide for either avoiding the impact by modifying the action or salvage if avoidance is not possible. Where the action can be modified this measure would be 100% effective. Where salvage is necessary there may be a potential for a slight loss of available information.

3. Early grazing might cause a loss of vegetative vigor and production.

Mitigating measure 3 will be applied to this impact.

Requiring that bands of summer sheep turnout in the southeast corner of Cyclone pasture during odd numbered years and in the northwest corner of Cyclone pasture during even numbered years would probably avoid a loss of vegetative vigor and production. However, no pertinent research studies have been located which document the effectiveness of this mitigation measure, although this is similar to deferred rotation grazing which is thoroughly documented in range management literature. This mitigation would be 100% effective.

4. Concentrated livestock use on Lost Soldier Creek and Sand Spring would continue adverse impacts on nesting habitat for waterfowl, sage grouse and nongame birds.

Mitigating measure 4 will be applied to this impact.

Mitigation of the impact will be 100% effective in the fenced livestock exclosures. The loss of three winter sheep AUMs would not significantly affect livestock operations. There would be no significant impacts to pronghorn or mule deer.

5. Allowing a sheep bed ground to be grazed more than one 7-day period in one grazing season would cause a decrease in plant vigor, seed production, litter accumulation, and seedling establishment.

Mitigating measure 5 will be applied to this impact.

Allowing a sheep bed grounds to be grazed only one 7-day period in one grazing season will be 100% effective, because use of the bedding grounds once during the grazing season will give the vegetation a chance to replenish food reserves, improve plant vigor and litter accumulation.

6. Sheep bedding at the Crooks Creek Medicine Wheel could adversely impact this National Register eligible property.

Mitigating measure 6 will be applied to this impact.

Excluding sheep bedding from the medicine wheel would mitigate adverse impacts 100%.

7. Lack of vegetative cover on a disturbed site increases the probability of invasion by undesirable vegetative species and also increases the potential erosion for that site.

Mitigating measure 7 will be applied to this impact.

Reseeding disturbed sites would mitigate this impact 100% as seedings would be repeated until a successful stand is established.

8. Some pronghorn could be prevented from migrating out of the ES area in the event of an early winter storm, since the date for letting down the let-down fence is October 20.

Mitigating measure 8 will be applied to this impact.

Changing the date of letting down the 27.8 miles of let-down fence from October 20 to October 1 would reduce the probability of a severe storm or snow accumulation forcing pronghorn migrations while the fence is up. The risk of pronghorn losses is therefore reduced. However, the effectiveness of this measure is impossible to adequately estimate since only one October storm has occurred in 26 years. (Snow depth data from 1950 to 1975 was studied.)

9. Pronghorn could be hindered from migrating out of the Bull Springs area during winter storms, since the fence at Bull Springs is a Type 1 fence.

Mitigating measure 9 will be applied to this impact.

Changing the proposed fence from a Type 1 fence to a let-down fence with an October 1 let-down date and a May 20 put-up date would be 95% effective, based on 26 years of data (Appendix B-4-1).

10. Type 1 and let-down fences could cause injury or death to wild horses since the fences would be harder to see without flagging, flashers, or a wooden top rail.

Mitigating measure 10 will be applied to this impact.

Changing the Type 1 and let-down fences in identified problem areas to fences with flagging, flashers, or a wooden top rail would reduce the potential wild horse injuries and mortalities, but no data are available on which to quantify the degree of reduction.

11. Fences located on ridge tops would be a visual intrusion. This intrusion would not be apparent, however, at distances greater than one-half mile.

Mitigating measure 11 will be applied to this impact.

Locating fences on the windward side of ridges would generally place them below the horizon and eliminate the majority of visual intrusions. The proposed fences would create only minimal visual impacts.

12. Shiny, non-painted metal structures (e.g., storage tanks, windmills, troughs) would be visual intrusions.

Mitigating measure 12 will be applied to this impact.

Painting storage tanks and other structures with a non-contrasting color or dying fiberglass tanks a non-contrasting color (e.g., earth tones or vegetative tones) would reduce visual intrusions, since those colors would blend into the surrounding area. The glare caused by metallic structures would be completely mitigated by this measure.

13. Wells running continuously at maximum rate of flow could fill and overflow the overflow pit resulting in erosion problems, water loss, create new drainages, and channel cutting.

Mitigating measure 13 will be applied to this impact.

A well can be modified so that less water is pumped out with each cycle, or a less efficient windmill blade could be used. It may not be possible to completely modify an excessively flowing well on the first attempt, but within a couple of years, a satisfactory modification would be made. This would mitigate the impact 100%.

14. Wild horse use would result in slight overgrazing of the ES area and lead to deterioration of the vegetation.

Mitigating measure 14 will be applied to this impact.

Allocating 499 additional livestock AUMs for wild horses would mitigate this impact 100%.

Livestock forage would be allocated proportionately from each operator in the ES area which would have a negligible effect on the operators.

Table 4-1 presents a summary of impacts, mitigations, and residual impacts.

MONITORING, RESEARCH, AND STUDY PROGRAMS

Studies will be done to determine if the proposed action is meeting the established allotment management plan (AMP) objectives. The following studies and/or analyses will be carried out:

1. actual use studies;
2. utilization studies;
3. trend studies; and
4. climate analyses.

Actual Use Studies

These studies will be conducted to determine the actual grazing use of the ES area by livestock. The actual use data collected will provide the basis for billing the livestock operators for livestock use.

The studies are conducted several times during the livestock grazing season on each allotment being grazed by livestock. They are normally done as part of regular range supervision, by BLM personnel.

Several data sources are utilized:

1. Livestock operators are asked to provide BLM their actual use figures.
2. BLM personnel count and document actual livestock use.
3. Other sources such as Wyoming Game and Fish Department records or shearing pen counts are sometimes used.

Utilization Studies

These studies identify the amount of forage used by all herbivores. The data provide the basis to determine whether livestock stocking rates should be adjusted, and the adjustment levels. Adjustments would be made in order to attain proper forage utilization or to prevent over-utilization.

The studies will be conducted by BLM personnel several times during and at the close of the livestock grazing season in each allotment. The key forage plant method will be used (BLM Manual 4412.22). This is an

TABLE 4-1
SUMMARY OF MITIGATING MEASURES

Impact	Mitigating Measures	Residual Impact
	Water Resources	
Erosion and water loss at wells due to overfilling overflow pit.	13	0
	Vegetation	
Disturbed areas will be invaded by undesirable species.	7	0
Early grazing might cause a loss of vegetative vigor and production.	3	0
Allowing a sheep bed ground to be grazed more than once a year would cause a decrease in plant vigor, seed production, litter accumulation, and seedling establishment.	5	0
	Wildlife	
Reduction of habitat due to turning off critical wells. Animals would be forced to move.	1	0
Reduction of nesting habitat for waterfowl, sage grouse, and non-game birds as a result of reduced vegetative cover. Trampling of nests; reduced quality of aquatic habitat.	4	0
Loss of pronghorn on fence due to severe storm before let-down of fence is possible about every 12 years.	8	The residual impact is impossible to adequately estimate.
Winter kill of pronghorn at Bull Springs because of Type 1 fence.	9	The residual impact is 5%.
	Wild Horses	
Reduction of habitat and of free-roaming character due to turning off critical wells.	1	0

TABLE 4-1 (CONTINUED)
SUMMARY OF MITIGATING MEASURES

Impact	Mitigating Measures	Residual Impact
	Wild Horses	
Injuries and mortalities to not more than 5 wild horses horses annually from running into unnoticed fences.	10	No data are available to estimate the residual impact.
Vegetative deterioration as a result of slight overgrazing.	14	0
	Cultural Resources	
Moderate to severe trampling of cultural resources by livestock.	2	0
Distrubance of stone cairns at the Crooks Creek Medicine Wheel from using the area for sheep bedding.	6	0
	Visual Resources	
Visual intrusion of fence on ridge.	11	Fences which cross ridges would still be apparent.
Visual intrusion of unpainted metal surfaces.	12	Most of the metal structures would be visible. Glare from unpainted metal structures would be almost completely eliminated.

ocular method for estimating the degree of utilization of key forage plants.

Trend Studies

These studies will be run to identify any upward or downward trend and degree of change in the range condition. The data collected provide the basis for prescribing appropriate management action to arrest any downward trend. Trend studies are also used in combination with other studies to evaluate AMPs and their grazing systems.

The studies will be conducted annually by BLM personnel. Studies are done on each allotment grazed by livestock, within 5 days after the livestock are removed.

The Wyoming Integrated Pace Transect method (BLM Instruction Memo WSO 75-31) will be used. This 100-pace transect technique allows the gathering of vegetative, watershed, and wildlife information.

Climatic Studies

These studies will collect climatological data for each allotment. The data will be used in conjunction with trend and utilization studies to evaluate AMPs and their grazing treatments.

Climatic data for the Ferris AMP will be solicited quarterly during the livestock grazing season from the U. S. Weather Service's Muddy Gap Station.

A rain guage will be installed and data will be analyzed quarterly by BLM personnel during the cattle grazing season in the Stewart Creek allotment.

Two automatic weather stations will be installed in the Cyclone Rim allotment, one in the Cyclone Rim area, and one in the Battle Springs Flat area. Temperature, wind, and precipitation data will be monitored and analyzed quarterly during the year.

Monitoring Systems

Terrestrial Wildlife

The condition and trend of wildlife habitat in the Seven Lakes ES area will be monitored by the BLM through the implementation of the Wyoming Integrated Pace Transect (see Trend Studies section) method of vegetative analysis and forage utilization studies. Permanent transects will be placed in crucial pronghorn, mule deer, and sage grouse winter ranges. Summer habitat and fawning areas will also be monitored by this method.

Meadow and spring vegetation will be monitored by pace transect, line intercept, and forage utilization studies to determine if livestock exclusion is necessary to provide good quality wildlife habitat. Utilization cages will be placed in some meadows to estimate use by the paired plot method (BLM 4412.22B7).

The effects of the proposed let-down fences will be monitored by using aircraft to collect data on pronghorn migrations and distributions and snow depths along the fence. The data will be collected during the months of September, early October, May, and June, for a 5-year period. The let-down dates will be evaluated by use of these data.

Water Developments

The wildlife use of the proposed water developments will be monitored by the BLM, through bi-monthly observations. Data by species, numbers, and frequency will be collected over a 5-year period. The data will be analyzed to determine those developments which should be kept in operation during a pasture deferment.

Water Study

As part of the Rawlins District's regular water resources program, effects of the grazing systems on water quality, yields, sediment production, infiltration, and other factors relating to water will be monitored.

Streamflow and storm runoffs will be measured periodically to determine if water yields are affected by the proposed action as expected. Periodic grab samples to check possible water quality changes of streams, springs, and reservoirs will also be conducted. Bacteriological quality (coliform) would be an integral portion of the water quality monitoring.

In this way, impacts of grazing systems on water resources can be determined and compared to predictions. The results can be used in other grazing statements or in future planning of nearby areas.

Aquatic Wildlife

Crooks Creek, Lost Soldier Creek. Aquatic habitat analyses will be conducted by the BLM on these two drainages every 5 years, using the stream channel stability evaluation outlined in BLM Technical Note 283 (Appendix B-2-13). The data will be used to detect any changes in aquatic habitat which might influence subsequent livestock management decisions for the ES area.

CHAPTER 5

ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

The adverse impacts identified in Chapter 3 that were not mitigated or were partially mitigated by the measures described in Chapter 4 are identified in this chapter. Unavoidable adverse impacts are those that would occur if the proposed action is implemented as modified by the mitigating measures.

WATER RESOURCES

An unavoidable adverse impact of the proposed action would be that water consumption and evaporation would increase from 87 to 107 acre feet per year (ac ft/yr) at the long term. Ten-year storm runoffs on the representative drainages would be impacted in such a way that they would decline 79 ac ft/yr at the long term. A decrease in storm runoffs would not necessarily be adverse; in fact it may often be considered as beneficial since erosion and sediment discharged would be decreased. However, to supply enough water to fill reservoirs or to satisfy other water uses, a decrease in storm runoffs may be considered to be adverse.

The possibility exists, due to design failure or large storm events, that pits associated with the water improvements would be broached and damaged, creating head cutting and erosion.

VEGETATION

Unavoidable, long-term (or for the life of the project) removal of vegetation would occur from the following proposed projects: (1) fences—66.2 acres; (2) spring developments— 2.0 acres; (3) water developments—68.2 acres; (4) reservoir fencing—8.0 acres; and (5) pasture boundary signs—6.4 acres (See Appendix B-3-5). The total affected area would be 150.8 acres.

Vigor of plants grazed by livestock concentrated near limited water would probably be reduced, in the short term and long term.

ANIMALS

Terrestrial Wildlife

Forage Allocations

There would be a loss of 2,441 animal unit months (AUMs) from the present wildlife forage allocation. Since these AUMs would be consumed by livestock, they would not be available for wildlife use.

Competition for forage, cover, and space between winter livestock and big game wildlife (pronghorn and mule deer) would occur during severe winters. Although it is believed that these wildlife species would undergo additional stress and mortality as a result of this competition, research has not quantitatively shown this relationship. Therefore, it would not be possible to adequately predict or estimate the extent or effect of livestock-big game competition on the winter ranges in the ES area.

Fences

The Type 1 fence could cause some pronghorn mortality, depending on snow depth, weather conditions, and animal distributions. These fences could become movement barriers should snow depth hinder fence negotiation; however, they are designed to be located where no pronghorn migration occurs.

The let-down fence would cause pronghorn mortality during the period from May 20 to October 1 should a severe storm deposit enough snow to keep the animals from passing through the fence. Such mortality would depend on the time of the storm, the amount of snow deposited, the distribution of animals, and the weather conditions during the storm. An adequate estimate of losses is not possible due to the variability of the determining factors.

Water Developments

Loss of habitat around the proposed water developments would occur due to the construction and subsequent use of the areas. In crucial ranges, this would be cover lost during a critical portion of the life cycle. This would occur on pronghorn fawning and crucial winter ranges, sage grouse strutting-nesting and winter ranges, and in nongame use habitats. Although habitats would be lost, the impact on populations is unknown.

Aquatic Wildlife

Grazing Systems

Since Crooks Creek is on state of Wyoming lands, the Bureau of Land Management (BLM) cannot require it be fenced and protected from damage due to livestock. The fishery would remain in a poor to fair condition due to streambank sloughing, poor channeling, poor cover, and high sediment yields from heavy livestock use. As a result, this stream would maintain or slightly degrade in habitat quality and population.

Lost Soldier Creek would remain heavily used in the unfenced section, resulting in poor to fair habitat conditions for the species that depend on the area as habitat.

Wild Horses

An unavoidable adverse impact could be caused by the proposed fencing. The entire wild horse population would lose some of its free-roaming character, a few wild horses could be injured or killed by the proposed fencing each year, and the gene pool of the wild horses could be reduced because some bands could be cut off and unable to mix with the remaining wild horse bands, leading to an inbreeding increase.

LIVESTOCK GRAZING

The proposed fencing along the northern boundary may not completely control the drift of cattle into the Seven Lakes ES area from the north; therefore some herding would be required or trespass fines would be incurred. The required herding would also add operating costs to the operators. Additionally, the fencing was originally proposed to be let down October 20 while the cattle are still on the range. An early storm would scatter the stock, causing increased gathering costs as outlined above. The above impacts would be short-term and long-term residual impacts. Mitigation changed the October 20 date to October 1, amplifying the impacts.

The initial reductions in animal unit months (AUMs) would impact the operators at the short term.

CULTURAL RESOURCES

Impacts to cultural resources would continue at a moderate to minimal rate as a result of the presence of livestock grazing over a widespread, uninventoried area. Impacts at new sheep bed grounds would be severe if cultural resources are present.

Structural damage to certain cultural resources would also continue due to abrasion by cattle.

Surveys conducted are thorough, but because of the nature of cultural resources, it is possible that a site could be overlooked. This would be the case especially with subsurface cultural materials or those obstructed by vegetation. Damage occuring to unlocated sites could result in a severe residual impact either from trampling or during the construction process.

Even with the possible recovery of some cultural resource information after impact, the unavoidable, adverse impacts of livestock usage and human interference would be the continuing loss of cultural resource data over the long term.

VISUAL RESOURCES

The actual degree of residual visual impact is undeterminate. These residual impacts would be long term in nature, and well within the quality standards established for the visual resource management class in which they lie.

Locating water developments with windmills on the horizon could be a visual intrusion depending upon the viewer's perspective and perception of the water developments. Some might consider them picturesque, while others might consider them an intrusion.

SOCIOECONOMIC CONDITIONS

As indicated in the Livestock Grazing section of the ES, the proposed action includes initial reductions of animal unit months (AUMs) of livestock forage which could be licensed. The reductions amount to 27.5% in the Ferris allotment and 8.2% in the Seven Lakes allotment. Although the actual use would increase under the proposed action, this reduction represents a loss of potential income to the livestock operators.

The allocation of livestock forage to wild horses also represents a loss of livestock income. This amounts to $7,728 income per year.

Slight increases in operating costs could be incurred by the livestock operators due to increased levels of herding.

CHAPTER 6

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

For analysis purposes, the short term is defined as the period of time required to achieve the allotment management plan (AMP) objectives stated in Chapter 1. AMP objectives which have been determined through analysis to be achievable would be met by 1998 (approximately 15 years after full implementation of the proposed AMPs). The long term is defined as the period of time beyond 1998 in which impacts, as a result of project implementation, would still occur.

Minor long-term effects on water resources would result from the proposed action. Water consumption by livestock would increase in the long term. Storm runoff would be decreased and surface water quality would, in general, be increased by the long term. Overall, the impacts to water resources both in the short term and long term, are minor and would not produce significant changes, either positive or negative.

Construction of the proposed range improvements would cause a loss of 150.8 acres from vegetative production (.03% of the ES area). Adverse short-term impacts such as slight reduction in vigor and litter accumulation would be more than offset by the proposed yearlong rest periods.

Construction of the proposed fences and water developments would cause slight impacts to the ES area visual resources. These short-term impacts would continue into the long term, but would become less noticeable with time due to the projected development of minerals and accompanying man-made structures in the future. The construction of fences in the short and long term would also have the effect of slightly restricting the freedom of movement of recreation users in the area. Water developments would have the long-term effect of improving wildlife habitat which would in turn allow for increased hunter days in the long term. Slight damage to fences could occur in the long term due to unwillingness on the part of people to detour through gates.

By the long term, vegetative production would have increased by 4,087 winter animal unit months (AUMs); 547 fewer acres would be in poor condition; 21,625 fewer acres would be in fair condition; 55,683 fewer acres would be in good condition; and 77,855 more acres would be in excellent condition.

The increase in vegetative cover would occur in the short term. This would cause a slight long-term decrease in wind erosion on the soil resource.

Short-term losses of vegetation would occur immediately around water developments through trampling. The vigor of vegetation would be decreased in the vicinity of water developments through trampling. However, in the aggregate, the quantity and quality of the vegetative resource in the ES area would be enhanced in the long term by implementation of the proposed action.

The proposed action would allocate 3,434 AUMs of forage to wildlife. Big game would receive 1,325 AUMs, while the remaining 2,109 would be available for other wildlife. Although this represents a decrease from the present situation, the 1980 Wyoming Game and Fish Department's big game population objectives would be met. Those objectives are 5,000 wintering pronghorn, 1,339 summering pronghorn, and 175 mule deer yearlong.

Activation of 26,782 AUMs of livestock nonuse would have an adverse impact on pronghorn and nongame wildlife habitat. This impact would be in the form of a decrease in habitat quality. Activation of nonuse would increase the numbers of winter sheep in the ES area. This would increase competition for food and cover between livestock and wildlife, especially during severe winters.

Riparian areas along Lost Creek and Crooks Creek would continue to be overused by livestock. Nongame wildlife populations would remain below that which would result from decreased or eliminated livestock use. Sage grouse populations in riparian areas would be similarly limited.

Meadow areas would be slightly improved and increases in sage grouse and nongame animals should result.

Fences would benefit nongame populations. However, the proposed fences could be a severe risk to pronghorn populations during severe snowstorms if the fences were not let down as planned.

Water developments would produce beneficial impacts to wildlife. Pronghorn populations would increase by 300-800 animals by the long term in the late summer season.

Proposed fencing of four reservoirs would increase production of waterfowl by five to ten nesting pairs. Sage grouse and nongame animals would benefit from the water developments.

Aquatic wildlife habitat along Lost Soldier Creek and Crooks Creek would be maintained or slightly degraded by continued livestock use. Aquatic wildlife such as beavers and trout would remain at approximately the same population levels that presently exist.

Some wild horses could be expected to be injured or killed in the short term during attempts to cross fences proposed for the ES area. Furthermore, the wild and free roaming nature of wild horses would be inhibited somewhat in the short term. Inbreeding could result because of increased confinement. These impacts would occur in the short term and would continue in the long term.

The proposed action would cause continued impacts from livestock operations through the short term. These impacts would be in the form of trampling around water sources and sheep bedgrounds. Historic buildings would be damaged by livestock concentrations. These impacts, both to cultural resources, would continue in the long term.

The short-term impacts from the proposed action would be an initial reduction in licensed AUMs on public lands of 8.21% in the Stewart Creek and Cyclone Rim allotments and 27.5% in the Ferris allotment. Nonuse would be activated, classes of livestock would be changed, and the net effect of the above would be a short-term increase over present numbers of livestock grazing in the ES area. Total vegetative production (and livestock production) would increase slightly in the short term. Increased herding requirements would increase rancher operating costs slightly in the short term. In summary, the proposed action and associated short-term impacts would, in the aggregate, enhance long-term usability and productivity of the ES area in terms of livestock grazing.

The proposed action would produce increased income from livestock and recreation activities compared to the present situation in the short and long term. This increase is estimated to equal $398,309 in the short term and $436,751 in the long term. Short-term increases would occur in employment and ranchers would have increased fexibility to change class of livestock. Increases would be noted in assessed valuation of the region, social well being of the ranch operators would be enhanced, and the proposed action is compatible with public attitudes in the area.

Quality of life would be slightly enhanced for the ES area livestock operators, but would be virtually unaffected outside the ES area. Overall, however, the impacts would be minor and are confined largely to the ES area. Those impacts would continue to slightly enhance long-term productivity of the area.

In summary the trade offs associated with the proposed action would be minimal. That is to say that no major commitment of resources would be made in the short term to accomplish the increases in quality and quantity of vegetation, livestock grazing, and increased ES area livestock income.

CHAPTER 7

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This chapter identifies the irreversible and irretrievable commitments of resources resulting from the proposed action. The term irreversible is defined as use that is incapable of being reversed: once something is initiated, it would continue. The term irretrievable means irrecoverable: once something is used, it is not replaceable.

WATER RESOURCES

Livestock grazing on public land would consume 30 acre-feet of water per year at the long term. This would be an irretrievable commitment of resources.

ANIMALS

Wild Horses

Loss of the free movement of horses during the time the proposed range improvements remain in place would be an irretrievable commitment.

CULTURAL RESOURCES

Construction of range improvements may lead to the discovery of buried archeological or historical sites which would necessitate their excavation as a salvage measure. This could result in an irretrievable loss of the disturbed portion of the site. The trampling of archeological sites would result in an irretrievable displacement and alteration of artifacts. Trampling would also result in churning of sites, displacing artifacts and making it more difficult to interpret the site.

SOCIOECONOMIC CONDITIONS

Human resources, fuel, and materials used to implement the proposed action are considered to be irretrievable. Once the expenditures are made, those particular funds would not be available for alternative public programs.

CHAPTER 8

ALTERNATIVES

Six alternatives to the proposed action are addressed in this chapter. They are:

1. No action (continuation of present use),
2. Elimination of livestock grazing,
3. Implementation of the proposed action without fencing,
4. Reduced livestock use with additional consideration for wildlife crucial areas,
5. Livestock grazing at the level of proposed action with no changes in class of livestock, and
6. The proposed action with additional fencing.

In each alternative, as in the proposed action, livestock trespass control would be enforced. Range improvements would be constructed to Bureau of Land Management (BLM) standards described in Chapter 1.

Impacts of each alternative are analyzed at the short term (1986) and the long term (1998) as in the proposed action. The level of authorized livestock use, the number of range improvement projects (fences, water developments), the allocation of forage for wild horses and wildlife, the conversion from one class of livestock to another, and the implementation of grazing systems are all variable among the alternatives.

Those resources (Air Quality, Climate, Topography, Minerals, Land Use Plans, Transportation) which would not be impacted by any of the alternatives will not be discussed. Also, only those resources that would be impacted by an alternative are discussed under that alternative. A summary of the components of each alternative is presented in Table 8-1. Long term impacts associated with implementation of the proposed action and alternatives are summarized in Table 8-22 at the end of this chapter.

DESCRIPTION OF ALTERNATIVE 1: NO ACTION

Active livestock use would be set at the level of the average annual active use over the 5 years (1972-1976) by the Rawlins area livestock operators. (The Lander area operators would take their use outside the ES area.) Active use to be analyzed under this alternative would amount to 15,865 sheep animal unit months (AUMs) and 2,459 cattle AUMs in the Seven Lakes allotment, and 3,626 sheep AUMs and 338 cattle AUMs in the Ferris allotment. Appendix B-8-5 shows how these AUMs are distributed in the two allotments.

All livestock operators in the Seven Lakes and Ferris allotments would have their federal grazing privileges reduced in proportion to their present adjudicated privileges. All grazing privileges would be reduced to the average active use level in each allotment over the last 5 years. In the Seven Lakes allotment, the percentage reduction (68%) would be greater than that in the Ferris (37%), since the average percent nonuse in the Seven Lakes has been greater.

No conversions in class of livestock would be permitted (i.e., changes from winter sheep to summer cattle, etc., would not be allowed).

There would be only two grazing allotments—the Ferris and the Seven Lakes. The boundary of the existing Seven Lakes incommon allotment would be changed to follow the new Seven Lakes Planning Unit boundary and to exclude the Lander livestock operators from the ES area (Map 8-1).

The wild horse population would be set at its present level of 240 head. No forage would be allocated for wild horse use.

The reservation of forage for wildlife would continue to be that which was reserved in the 1958 adjudication (2,379 AUMs in the Seven Lakes and 358 AUMs in the Ferris), plus the 1,000 winter sheep AUMs in the Ferris allotment and the 2,951 winter sheep AUMs in the Seven Lakes allotment which were set aside for wildlife by agreement when the Wyoming Game and Fish Department purchased the base property to which these federal grazing privileges were attached.

No allotment management plans (AMPs) would be developed. Livestock would continue to graze the two allotments as they do today (no grazing systems would be designed).

Existing range improvement projects would be maintained. If a reservoir washed out in the future, it would be rebuilt as close to the original site as possible. Presently inoperable improvements would not be made workable. No new water developments or gap fences would be constructed.

Present seasons of use would be followed. The Seven Lakes allotment is normally used by cattle from May 1 until December 31; however, there is no established season of use. Sheep also may graze yearlong, but most sheep use (90% estimated) is from October 15 until May 15. The Ferris allotment is used by cattle from May 1 until November 30, and by sheep from October 31 until April 30.

ANALYSIS

Impacts on Soils

Implementation of Alternative 1 would result in decreased sediment yields (less than 0.1 acre-feet per square mile per year—ac ft/sq mi/yr) in the Seven Lakes allotment because of elimination of livestock drift into the area from the north. The Ferris allotment would receive the same amount of use as it now receives, and therefore no change in sediment yield would be anticipated.

TABLE 8-1
SUMMARY TABLE OF THE PROPOSED ACTION AND ALTERNATIVES AT TIME OF FULL IMPLEMENTATION

ALTERNATIVE	ALLOTMENTS	CLASS OF LIVESTOCK	SEASON OF USE 1/	NUMBER OF HEAD	AUMS 2/			TOTAL AUTHORIZED ACTIVE LIVESTOCK AUMS 3/	TOTAL POUNDS OF LIVESTOCK FORAGE USE 4/
					PUBLIC	STATE	PRIVATE		
1. No Action	Seven Lakes	Cattle	5/1 - 12/31	307	1,761	689	9	2,459	1,918,020
		Sheep	5/16 - 10/14	1,446	1,446	0	0	1,446	1,084,500
		Sheep	10/15 - 5/15	10,301	13,012	1,383	24	14,419	6,489,450
	Ferris	Cattle	5/1 - 11/30	48	209	110	19	338	263,640
		Sheep	10/31 - 4/30	3,022	3,335	239	52	3,626	1,631,700
TOTAL					19,763	2,421	104	22,288 3/	11,387,310
2. Elimination of Livestock Grazing	None	None	None	Trailing Use	None	None	None	133	59,850
TOTAL								133	59,850
3. Implementation of the Proposed Action Without Fencing	Stewart Creek	Cattle	5/20 - 10/31	1,125	9,750	501	9	10,260	4,679,971
		Sheep	11/1 - 3/31	6,166	6,081	78	7	6,166	2,774,700
	Cyclone Rim	Cattle	10/1 - 3/31	934	7,716	188	0	7,904	4,371,120
		Sheep	11/1 - 3/31	23,909	22,587	1,305	17	23,909	10,759,050
		Sheep	5/1 - 7/15	1,836	1,735	0	0	1,735	688,500
	Ferris	Cattle	5/15 - 10/15	98	884	110	19	1,013	382,200
		Sheep	11/1 - 3/31	3,882	3,591	239	52	3,882	1,746,900
TOTAL					52,344	2,421	104	54,869	25,402,441
4. Reduced Licensed Livestock Use	Stewart Creek	Cattle	5/20 - 10/31	723	6,088	501	9	6,598	3,007,661
		Sheep	11/1 - 3/31	3,774	3,659	78	7	3,744	1,684,800
	Cyclone Rim	Cattle	11/1 - 3/31	692	4,690	188	0	4,878	2,698,800
		Sheep	11/1 - 3/31	16,540	15,218	1,305	17	16,540	7,443,000
	Ferris	Cattle	5/15 - 10/15	68	579	110	19	708	265,200
		Sheep	11/1 - 3/31	2,511	2,220	239	52	2,511	1,129,950
TOTAL					32,454	2,421	104	34,979	16,229,411

TABLE 8-1 (CONTINUED)
SUMMARY TABLE OF THE PROPOSED ACTION AND ALTERNATIVES AT TIME OF FULL IMPLEMENTATION

ALTERNATIVE	ALLOTMENTS	CLASS OF LIVESTOCK	SEASON OF USE 1/	NUMBER OF HEAD	AUMS 2/			TOTAL AUTHORIZED ACTIVE LIVESTOCK AUMS 3/	TOTAL POUNDS OF LIVESTOCK FORAGE USE 4/
					PUBLIC	STATE	PRIVATE		
5. Livestock Grazing at the Level of the Proposed Action with No Changes in Class of Livestock	Seven Lakes	Cattle	6/1 - 10/31	616	4,072	689	9	4,770	2,402,400
		Sheep	10/15 - 3/31	40,302	42,923	1,383	24	44,330	19,949,400
		Sheep	6/1 - 8/1	2,295	1,735	0	0	1,735	688,500
	Ferris	Cattle	5/15 - 10/15	75	513	110	19	642	292,500
		Sheep	11/1 - 3/31	4,253	3,962	239	52	4,253	1,913,850
TOTAL					53,205	2,421	104	55,730 3/	25,246,650
6. Proposed Action with Additional Pasture Boundary Fencing	Stewart Creek	Cattle	5/20 - 10/31	1,125	9,750	501	9	10,260	4,679,971
		Sheep	11/1 - 3/31	6,166	6,081	78	7	6,166	2,774,700
	Cyclone Rim	Cattle	10/1 - 3/31	934	7,716	188	0	7,904	4,371,120
		Sheep	11/1 - 3/31	23,909	22,587	1,305	17	23,909	10,759,050
		Sheep	5/1 - 7/15	1,836	1,735	0	0	1,735	688,500
	Ferris	Cattle	5/15 - 10/15	98	884	110	19	1,013	382,200
		Sheep	11/1 - 3/31	3,882	3,591	239	52	3,882	1,746,900
TOTAL					52,344	2,421	104	54,869	25,402,441
PROPOSED ACTION	Stewart Creek	Cattle	5/20 - 10/31	1,125	9,750	501	9	10,260	4,679,971
		Sheep	11/1 - 3/31	6,166	6,081	78	7	6,166	2,774,700
	Cyclone Rim	Cattle	10/7 - 3/31	934	7,716	188	0	7,904	4,371,120
		Sheep	11/1 - 3/31	23,909	22,587	1,305	17	23,909	10,759,050
		Sheep	5/1 - 7/15	1,836	1,735	0	0	1,735	688,500
	Ferris	Cattle	5/15 - 10/15	98	884	110	19	1,013	382,200
		Sheep	11/1 - 3/31	3,882	3,591	239	52	3,882	1,746,900
TOTAL					52,344	2,421	104	54,869	25,402,441

TABLE 8-1 (CONTINUED)
SUMMARY TABLE OF THE PROPOSED ACTION AND ALTERNATIVES
AT TIME OF FULL IMPLEMENTATION

ALTERNATIVE	ALLOTMENTS	WILD HORSE POPULATION (YEARLONG)	WILD HORSE FORAGE USE (LBS) 5/	WILDLIFE (BIG GAME) ANIMAL MONTHS OF USE		WILDLIFE (BIG GAME) FORAGE USE (LBS) 6/	TOTAL LBS. CONSUMPTIVE FORAGE USE	TOTAL LBS. OF FORAGE PRODUCTION
1. No Action	Seven Lakes	214	2,311,200	Pronghorn	29,874	1,613,196	14,064,366	89,129,885
				Mule Deer	1,800	648,000		
	Ferris	26	280,800	Pronghorn	8,160	440,640	2,724,780	11,335,146
				Mule Deer	300	108,000		
TOTAL		240	2,592,000			2,809,836	16,789,146	100,465,031
2. Elimination of Livestock Grazing	None	135	1,458,000	Pronghorn	38,034	2,053,836	2,869,686	100,465,031
				Mule Deer	2,100	756,000		
TOTAL		135	1,458,000			2,809,836	2,869,686	100,465,031
3. Implementation of the Proposed Action without Fencing	Stewart Creek	57	615,600	Pronghorn	14,940	806,760	9,201,031	31,958,032
				Mule Deer	900	324,000		
	Cyclone Rim	57	226,800	Pronghorn	14,934	806,436	17,564,706	57,171,853
				Mule Deer	900	324,000		
	Ferris	21	226,800	Pronghorn	8,160	440,640	2,904,540	11,335,146
					300	108,000		
TOTAL		135	1,069,200	Mule Deer		2,809,836	29,670,277	100,465,031
4. Reduced Licensed Livestock Use	Stewart Creek	57	615,600	Pronghorn	14,940	806,768	6,438,829	31,958,032
				Mule Deer	900	324,000		
	Cyclone Rim	57	615,600	Pronghorn	14,934	806,436	11,887,836	57,171,853
				Mule Deer	900	324,000		
	Ferris	21	226,800	Pronghorn	8,160	440,640	2,170,590	11,335,146
				Mule Deer	300	108,000		
TOTAL		135	1,458,000			2,809,844	20,497,255	100,465,031

TABLE 8-1 (CONTINUED)
SUMMARY TABLE OF THE PROPOSED ACTION AND ALTERNATIVES
AT TIME OF FULL IMPLEMENTATION

ALTERNATIVE	ALLOTMENTS	WILD HORSE POPULATION (YEARLONG)	WILD HORSE FORAGE USE (LBS) 5/	WILDLIFE (BIG GAME) ANIMAL MONTHS OF USE		WILDLIFE (BIG GAME) FORAGE USE (LBS) 6/	TOTAL LBS. CONSUMPTIVE FORAGE USE	TOTAL LBS. OF FORAGE PRODUCTION
5. Livestock Grazing at the Level of the Proposed Action with No Changes in Class of Livestock	Seven Lakes	114	1,231,200	Pronghorn	29,874	1,613,204	26,532,908	89,129,885
				Mule Deer	1,800	648,204		
	Ferris	21	226,800	Pronghorn	8,160	440,640	2,981,790	11,335,146
				Mule Deer	300	108,000		
TOTAL		135	1,458,000			2,810,048	29,514,698	100,465,031
6. Proposed Action with Additonal Pasture Boundary Fencing	Stewart Creek	57	615,600	Pronghorn	14,940	806,760	9,201,031	31,958,032
				Mule Deer	900	324,000		
	Cyclone Rim	57	615,600	Pronghorn	14,934	806,436	17,564,706	57,171,853
				Mule Deer	900	324,000		
	Ferris	21	226,800	Pronghorn	8,160	440,640	2,904,540	11,335,146
				Mule Deer	300	108,000		
TOTAL		135	1,458,000			2,809,836	29,670,277	100,465,031
Proposed Action	Stewart Creek	57	615,600	Pronghorn	8,160	806,760	9,201,031	31,958,032
				Mule Deer	300	324,000		
	Cyclone Rim	57	615,600	Pronghorn	14,940	806,436	17,564,706	57,171,853
				Mule Deer	900	324,000		
	Ferris	21	226,800	Pronghorn	14,934	440,640	2,904,540	11,335,146
				Mule Deer	900	108,000		
TOTAL		135	1,458,000			2,809,836	29,670,277	100,465,031

TABLE 8-1 (CONTINUED)
SUMMARY TABLE OF THE PROPOSED ACTION AND ALTERNATIVES
AT TIME OF FULL IMPLEMENTATION

1/ Season of Use--Period of time livestock would use each allotment.

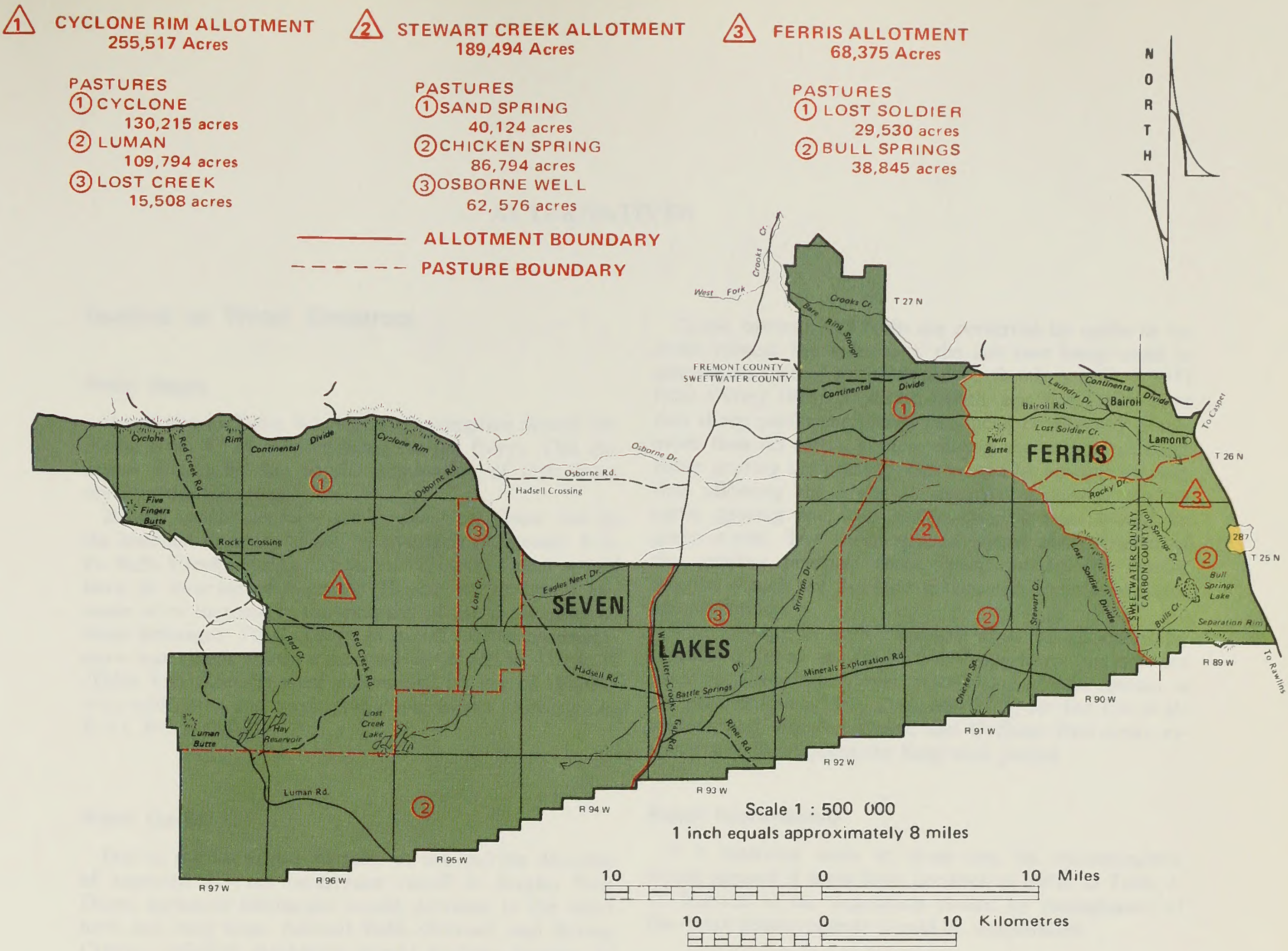
2/ Total public, state, and private lands included in the proposed action (see Table 1-2). Use on state and private lands would be authorized by exchange-of-use agreement.

3/ Livestock AUMs are expressed as winter sheep AUMs using conversion factors (Ferris: 2.07 winter sheep to 1.00 summer cattle AUM: Stewart Creek: 1.71 winter sheep to 1.00 summer cattle; and Cyclone Rim: 1.41 winter sheep to 1.00 winter cattle-1.89 winter sheep to 1.00 summer sheep) based on forage ratios, except under Alternative 1.

4/ One cow consumes 780 pounds of forage per month and one sheep consumes 150 pounds per month in summer and 90 pounds per month in winter (Rice 1975).

5/ A wild horse consumes 900 pounds of forage per months (Rice 1975).

6/ A pronghorn antelope consumes 54 pounds of forage per month (Severson, May, and Hepworth 1968). A mule deer consumes 360 pounds of forage per month (Rue 1968).



PROPOSED GRAZING ALLOTMENTS OF THE NO ACTION ALTERNATIVE

Seven Lakes Grazing
Environmental Statement

Map 8 - 1

Impacts on Water Resources

Water Supply

As shown in Table 8-2, water consumption would decrease from 87 to 86 acre-feet/year (ac ft/yr). This decrease would be due to the elimination of drift from north of the ES area.

Runoff would decrease on Eagles Nest Draw due to the lessened intensity of use by livestock (Appendix B-3-8). Bulls Creek, Spring Creek, and Stewart Creek would have an increase of expected 10-year storm runoff because of an increase in the intensity of use in the area of those drainages. Total change in runoff for the representative watersheds shows a decrease from 345 to 335 ac ft (Table 8-3). Runoffs were determined by use of HYMO with infiltration and vegetative cover inputs (Appendices B-3-1, B-3-2, B-3-8).

Water Quality

Due to the decreased intensity of use and the decrease of expected 10-year recurrence runoff in Eagles Nest Draw, sediment discharges would decrease in the short term and long term. Around Bulls, Stewart, and Spring Creeks, sediment discharges would increase because of increased intensity of use. Since the precise relationship between runoffs and sediment discharges is not known, it is not possible to predict the amount of lessened total sediment yields transported by runoffs. Salinity transported would respond in the same manner that sediment discharges would be expected to change. The USGS survey in 1976 showed a direct relationship between salinity and sediment levels in the Seven Lakes stream flows.

Impacts on Vegetation

Grazing of the Seven Lakes ES area has taken place by livestock for approximately 100 years (see Livestock Grazing section Chapter 2). Under this alternative, the vegetation trend would be expected to remain the same as the present situation. Table 8-4 shows the short-term impacts on terrestrial vegetation by allotment and season of use for the alternative. Grazing of vegetative species removes portions of the plant which are vital in the production of carbohydrates. The time of defoliation is the most critical in determining the extent of damage to the plant species. Garrison (1972) states that fall and winter seasons are the least detrimental periods of utilization of shrubs. Late spring and the middle of the growing season, when the carbohydrate reserves are the lowest, are the most damaging periods of use (refer to Figure 8-1).

Grass, browse, and forbs are preferred by cattle in the order named, the volume of the last two being small in relation to that of grass (Stoddart, Smith, and Box 1975 from Culley 1938). Stoddart, Smith, and Box (1975) state that sheep prefer the forage produced on shrubby plants more than do cattle. Hence, during the time of summer sheep grazing the grass species would be receiving a rest, thus allowing the vigor to improve. Likewise, during cattle grazing the forb and browse species would be given a rest. The shrub species would receive most of the grazing pressure from sheep during the winter months, which are the least detrimental months in terms of defoliation.

The acreage in each condition class by allotment by pasture is listed in Table 8-5. Long-term impacts are listed in Table 8-6. Cover percentages would remain at the present level, 18%, 25%, and 27%, for the Ferris allotment and, Stewart Creek, and Cyclone Rim areas, respectively, throughout the long-term period.

Range Improvements

If a reservoir were to wash out, its reconstruction would remove 4 acres from production (refer to Table 3-1). Impacts to the vegetation caused by maintenance of the range improvements would be insignificant.

Threatened or Endangered Species

Impacts to any threatened or endangered vegetative species found within the Seven Lakes ES area would be the same as those discussed in Chapter 3.

Summary

This alternative, overall, would cause essentially no change in the vegetation of the ES area compared to the present situation. Range condition and vegetative production would remain unchanged. The impacts from range improvements would be insignificant.

Impacts on Animals

Terrestrial Wildlife

Forage Allocations. Under this alternative the wildlife forage allocations would remain at the present level (Table 2-17). However, with the level of authorized livestock use set at the averaged active use from 1972-1976, there would be more forage guaranteed for wildlife use. Since the livestock operators could not activate all their

TABLE 8-2
WATER CONSUMPTION AND LOSS FROM EVAPORATION UNDER ALTERNATIVE 1

	Acre-Feet of Water Per Year		
	Present	Short Term	Long Term
Livestock Consumption			
Ferris Allotment	2	2	2
Seven Lakes Allotment	12	10	10
Total	14	12	12
Wild Horse Consumption	3	3	3
Wildlife Consumption	1	2	2
Evaporative Losses	69	69	69
Total Consumption	87	86	86

TABLE 8-3
TEN-YEAR RECURRENCE RUNOFF BY REPRESENTATIVE DRAINAGES UNDER ALTERNATIVE 1

Allotment and Representative Drainages	Acre-Feet Runoff		
	Present	Short Term	Long Term
Ferris			
(Lost Soldier Creek)	165	125	125
Seven Lakes			
(Stewart Creek)	35	45	45
(Spring Creek)	37	50	50
(Bulls Creek)	28	35	35
(Eagles Nest Draw)	80	80	80
Total	345	335	335

TABLE 8-4
ALTERNATIVE 1: PREDICTED SHORT-TERM IMPACTS ON VEGETATION BY SEASON OF USE

Allotment Name	Season-of-Use	Class of Livestock	Short-term Impacts (1986)
Ferris	May 1 - November 30	Cattle	No change.
	October 30 - April 30	Sheep	No change.
Seven Lakes	May 1 - December 31	Cattle	Vigor, seed production, litter accumulation increased. Trampling of seeds decreased.
	October 15 - May 15	Sheep*	No change.
	May 16 - October 14	Sheep	No change.

*Sheep use is made year-round, but 90% of the use is estimated to be between October 15 through May 15.

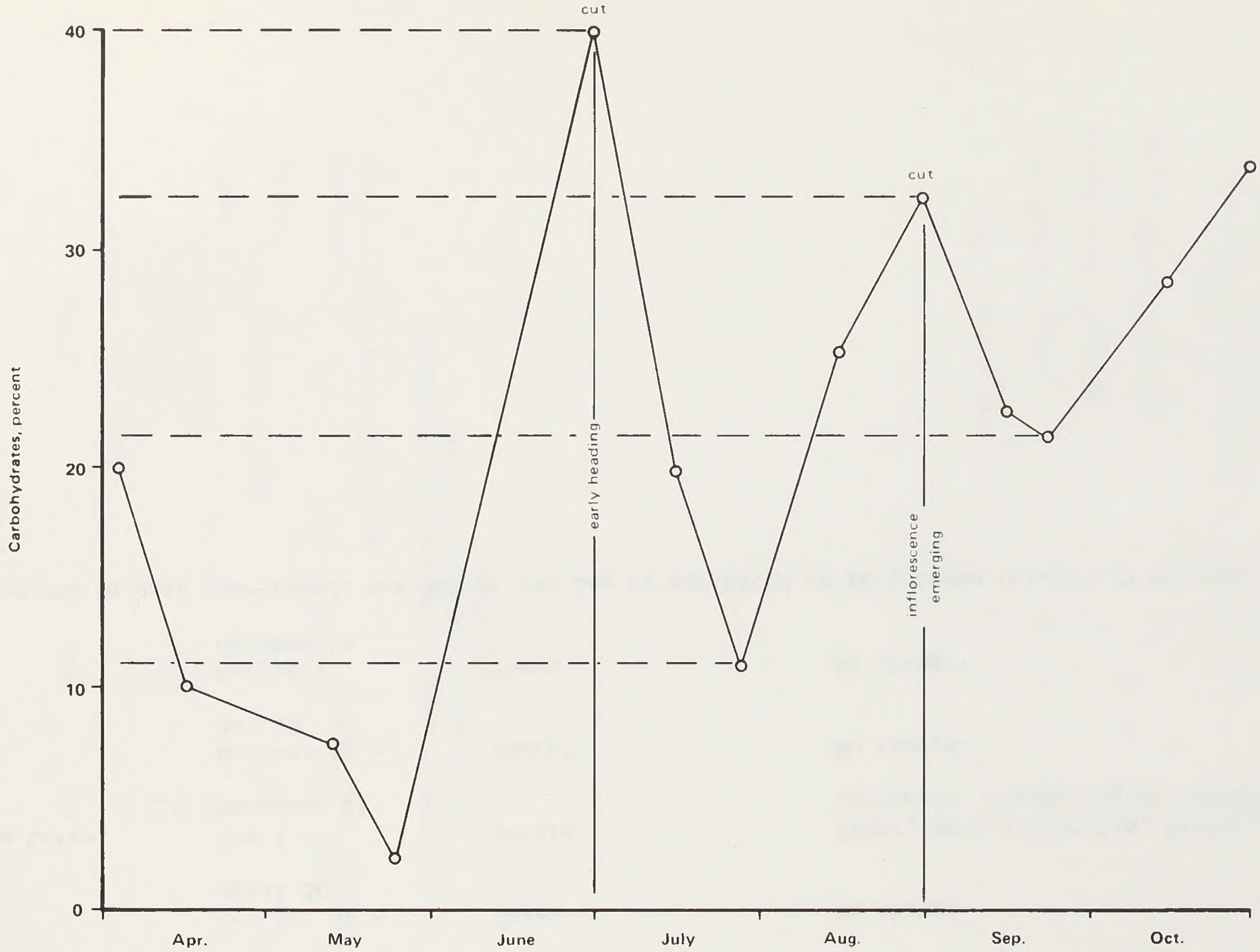


Figure 8 - 1

TIME OF DEFOLIATION RELATED TO CARGOHYDRATE RESERVE *

*Stoddart, Smith, and Box (1975)

TABLE 8-5
ALTERNATIVE 1: ACREAGE IN EACH CONDITION CLASS IN 1998*

Allotment & Pasture Name	Poor	Fair	Good	Excellent
Ferris				
Lost Soldier	1,007	12,818	14,032	488
Bull Springs	1,379	21,148	14,337	774
Stewart Creek				
Osborne Well	199	7,922	54,416	0
Sand Springs	1,612	9,687	23,903	4,296
Chicken Springs	108	16,611	68,925	1,115
Cyclone Rim				
Cyclone	0	14,570	91,506	22,564
Luman	0	14,927	71,444	22,367
Lost Creek	0	2,393	10,907	2,208

*Refer to Appendix B-8-7 for methodology in determining future range condition.

TABLE 8-6

ALTERNATIVE 1: PREDICTED PRODUCTION AND PREDICTED KEY SPECIES COMPOSITION COMPARED TO THE PRESENT AND POTENTIAL PRODUCTION AND PRESENT KEY SPECIES COMPOSITION*

Allotment Name and Vegetation Type	Present Produc-tion (AUMs)	Predicted Produc-tion by 1998 (AUMs)	Potential Produc-tion (AUMs)***	Present Key Species Compostion** (%)				Predicted Key Species Composition by 1998 (%)			
Ferris	5,625	5,625	12,766	Agda	Orhy	Pose	Artr	Agda	Orhy	Pose	Artr
Sagebrush				16	2	2	29	16	2	2	29
Grass				20	5	2	16	20	5	2	16
Greasewood				10	8	2	T	10	8	2	T
Seven Lakes	54,995	54,995	85,691	Agda	Artr	Atnu	Orhy	Agda	Artr	Atnu	Orhy
Sagebrush				8	26	7	4	8	26	7	4
Grass				15	10	7	2	15	10	7	2
Saltbush				-	5	38	-	-	5	38	-
Greasewood				-	2	28	-	-	2	28	-
Total	60,620	60,620	98,457								

*All AUMs are expressed in terms of winter sheep AUMs.
**"T" = trace and "-" = not a key species in that vegetative type in that allotment.
***From USDA Soil Conservation Service Method described in National Range Handbook.

nonuse in this alternative, the habitat conditions and carrying capacities would remain at their present levels. Thus there would be enough forage to support the 1980 management objectives for pronghorn and mule deer, and support the numerous other game and nongame wildlife inhabiting the ES area. In addition, the additional guaranteed forage would support some limited population increases that the are judged to be environmentally sound, based on limiting factors in and out of the ES area, proper grazing management, population dynamics, and land use activities.

Habitat Condition. The livestock use proposed in this allotment would not significantly change the habitat conditions Tables 2-24, 2-27, 2-29, and 2-30 in the ES area. Although, the apparent trend data for pronghorn habitat (Chapter 2) show a downward trend in some areas, it is believed that there would be no real change in the present habitat conditions. Those habitat conditions described in Chapter 2 would be expected to remain in their present state over the long-term period since the the livestock use would be limited to the present situation. Thus, wildlife populations would be expected to maintain or slightly exceed management objectives for the area and allow for normal population fluctuations of other wildlife species.

Aquatic Wildlife

This alternative would provide for the continuation of an existing downward trend in aquatic habitat conditions (refer to Chapter 2) on Crooks and Lost Soldier Creeks. The fishery on Crooks Creek is expected to be reduced by 20%-50% by 1998 due to increased human disturbance, continued livestock abuse, and reduced water flows. Lost Soldier Creek would also undergo a degradation of aquatic habitat quality for the same reasons. The riparian zones would not significantly improve by the long-term period should livestock use continue in these areas.

Wild Horses

Since wild horse numbers would be held at the present level (240) and active livestock grazing would be held at the 5-year average active use level, forage competition between wild horses and livestock should not increase over the present.

With only replacement of existing water sources, there would be increased competition for water among livestock, wild horses, wildlife, and even energy drilling companies, especially over the long term.

The net impact to wild and free-roaming horses in the Seven Lakes ES area from Alternative 1 would be increased competition for water. Control of cattle drift from the Green Mountain area would decrease competition for forage by the short and long terms.

Impacts on Cultural Resources

Impacts presently occurring to cultural resources would continue due to this alternative.

Impacts on Visual Resources

Impacts to visual resources under the no action alternative would be virtually identical to those under the present situation. This would be the case both in the short and long term.

Impacts on Recreation

Under Alternative 1, recreation activities would be expected to remain the same as under the present situation, both in terms of magnitude and scope. Recreation days would remain as shown in Table 2-42.

Impacts on Wilderness

This alternative would be the same as a continuation of the present situation. The wilderness inventory and analysis process, as described in Chapter 2, would continue unaffected by livestock grazing activities in the ES area.

Impacts on Livestock Grazing

The livestock operators to the north of the ES area, mostly cattlemen but including one sheepman, would be cut out of an area they have traditionally used and would be required to take their authorized use in the proposed Arapahoe Creek allotment (Map 2-19). Without fencing, extensive herding would be necessary to keep their cattle from drifting back into the ES area. It is possible that consistent trespass fines would need to be levied against the Arapahoe Creek and Green Mountain users to reduce the drift problem by the short term, requiring extensive range use supervision by BLM. The ES area range users would benefit by no longer having competition for forage and water with the Lander users in the short-term period.

The ES area operators who have been actively using their grazing privileges would have the number of their AUMs reduced, while those who have been taking more nonuse than average or no active use may have to increase the size of their herds, lease their operations, or sell to another operator.

Water supplies would stay about the way they are in the present situation, so many parts of the Seven Lakes would remain too far from water to be grazed by livestock. Therefore, areas within approximately one-half mile of existing livestock water sources would continue to be overstocked and overgrazed.

Because of poor water distribution some areas would be heavily grazed because livestock would concentrate around existing waters. There may be too many livestock for the amount of suitable range in these areas, leading to overgrazing of the suitable range. In turn, livestock production (weights, calf crop percent, etc.) could decrease. This impact is a continuation of the present situation.

Impacts on Socioeconomic Conditions

The alternative of no action would essentially freeze the level of livestock grazing at the average level of the previous 5 years. All livestock operators would have their grazing privileges reduced so that total licensed AUMs would equal the previous 5 years active use (see Description of Alternative 1). This would result in the reduction of the size of all the Seven Lakes livestock operations, some to a size which would probably make it not worthwhile to continue to graze livestock in the ES area. For example, one operator runs about 2,377 head of sheep in the ES area for 2 months. This alternative would result in this operator being reduced to approximately 505 sheep for 2 months. It is likely that a reduction of this magnitude would force this operator (and possibly others) to either drop his ES area grazing privileges or substantially alter his ranch operation. If he had no other lands to fall back on the size of his ranch would be reduced. Furthermore, the costs of running a band of only 500 sheep may be higher on a per sheep unit basis than they would be for the original band of 2,377. In all probability this alternative would cause some operators to drop their ES area privileges. They would probably be picked up by other operators in the ES area by purchases of base property to which the privileges were attached. The final result would be fewer operators using the Seven Lakes ES area than at present.

Income

The ES area livestock income would be the same under this alternative as under the present situation. This would amount to $286,268 in both the short and long term. The multiplier effect would produce income equal to $466,903 in both the short and long term.

Recreation income would, as in the present situation, consist of expenditures made largely in the retail sector as a result of sage grouse and pronghorn hunting. These would be equal to the present situation. They would amount to $68,178 in the short term and $74,250 in the long term. The multiplier effect would produce a total contribution to the economy of $70,554 in the short term and $76,849 in the long term.

Employment

This alternative would have no effect on overall employment generated by livestock operations in the ES area. There would, however, be shifts in control of AUMs between operators. The impacts to employment would be minor short-term impacts and would not be felt outside the group of Seven Lakes ES area operators.

Assessed Valuation

It is not believed that this alternative would have any effect on present overall assessed valuation of the area. This is due to the fact that no significant changes in the numbers of livestock should occur.

Social Well-Being

This alternative would have no effect on social well-being in the three county region consisting of Sweetwater, Carbon, and Fremont counties. It would, however, adversely affect the well-being of some of the ES area operators. Reducing the size of operations and subsequent ranch consolidations would likely force changes in professions which otherwise may not have occurred.

Socio-Cultural Attitudes

Any decrease in the amount of forage available to livestock operators is not favorably viewed by the ranching community. It would be viewed as an arbitrary act done without regard for the privilege of the operators to use public land and without regard for the ranching way of life enjoyed by the ES area permittees.

DESCRIPTION OF ALTERNATIVE 2: ELIMINATION OF LIVESTOCK GRAZING

Under this alternative, all existing grazing privileges and cooperative agreements would be canceled. Livestock operators with investments in cooperative agreements would be entitled to appropriate project salvage rights. It is assumed, for analysis, that no livestock use would be made on state and private lands within the ES area under this alternative. This assumption is based upon the fact that, if livestock grazing were attempted, fencing would be required around each block of state or private land to be grazed. Fencing one section of land would cost approximately $6,400 and the return would be approximately 40 animal unit months (AUMs) of forage per year; so it is unlikely a rancher would use state or private lands within the ES area. Limited trailing through the ES area would occur. This trailing use would consist of two bands of 2,000 sheep each. One band would cross from north to south in the fall; one would cross from south to north in the spring. Each would take 5 days to cross the area. The total forage consumed during trailing would be 133 AUMs (2,000 sheep for 10 days). No forage allocation would be made for trailing.

The purpose of this alternative would be to reserve all available forage for resource values other than livestock grazing (see Appendix B-8-1).

The wild horse population would be maintained between 66 and 135 animals. Rice (1975) stated moderately active horses' forage consumption on rangeland for summer maintenance would be 26 to 30 pounds per day, and that a mature horse on winter range would eat about 30 pounds of dry matter daily. Therefore, the maximum number of horses (135) to be found in the ES area during any one year would consume 1,458,000 pounds of forage annually (135 horses x 30 pounds per day x 30 days per month x 12 months per year).

All remaining forage would be set aside for wildlife use, and the enhancement of the watershed and visual resources. The methodology for forage allocations for this alternative is explained in Appendix B-8-1.

No range improvement projects for livestock would be constructed. Existing water sources on public land would be retained for the benefit of wildlife and wild horses (Map 2-2). Man-made federal water developments would be maintained by BLM as necessary for wild horses and wildlife. Existing fences, including the District boundary fence on the west side of the ES area and the Highway 287 right-of-way fence on the east side of the ES area would remain in place.

ANALYSIS

Impacts on Soils

Implementation of Alternative 2 would have the effect of decreasing sediment yields by less than 0.1 acre foot per square mile per year because of the anticipated increases in ground cover.

Impacts on Water Resources

Water Supply

Consumption of water by livestock would cease because of elimination of livestock grazing (Table 8-7). Livestock consumption would decrease to 0 from 14 acre feet per year (ac ft/yr). Total consumption would decrease from 87 to 72 ac ft/yr due to this alternative.

Because of elimination of grazing, vegetative cover would increase and intensity of use would decrease, causing a large decrease in expected 10-year recurrence storm runoffs (Table 8-8). Runoffs were predicted using HYMO with inputs of vegetative cover and infiltration (Appendices B-3-1, B-3-2, B-3-8).

Water Quality

Because of the decrease in 10-year storm runoff caused by lessened grazing intensity and vegetative increases, sediment discharges—which are related to runoff—would also be expected to decrease (see Soils). The amount of decrease in sediment discharges is not known since precise relationships are not known. Salinity transported would also decrease because of the decrease in amounts of sediment discharges.

Bacteriological pathogens from livestock would be eliminated, but just how this would change total bacteriological pathogen levels is not known.

Impacts on Vegetation

Elimination of livestock grazing should allow increased vigor, litter accumulation, and reproduction of individual plants by the short and long term. Grazing of the ES area by wild horses would impact the vegetation in the areas of wild horse concentration (refer to Map 2-17). The wild horses would remain in certain areas until the forage available was limiting. Short-term impacts to the vegetation where the horses would concentrate would be decreased vigor, seed production, litter accumulation, and seedling establishment.

Increased pronghorn numbers would not impact the vegetation to a significant enough degree to cause any changes in the vegetation. The allocation of forage for wildlife would be adequate to support the increase in pronghorn. The pronghorn should be dispersed enough throughout the ES area not to cause overgrazing.

Table 8-9 compares the predicted production in 1998, and the future key species composition with the present production and key species composition.

Range condition would be expected to remain approximately the same as the present situation. A study by McLean and Tisdale (1972) in British Columbia found that it took 40 years for range in poor condition to recover to good condition when protected from livestock grazing. It took approximately 20 years for range in fair condition to recover to good condition. Therefore, it is assumed that the recovery of the range to the next highest condition class would take longer than the long-term time period (1998).

A study by H. G. Fisser and R. E. Ries compares two treatments; no grazing and grazing. The average total basal cover inside the control was 6% from 1962 to 1970. The average total basal cover outside of the control from 1962 to 1970 was 5%. Cover of the ES area would be expected to increase an estimated 2% by the long term. The main reason for the increase in cover would be the slight increase in production. The elimination of livestock would also cause the increased cover because livestock would consume portions of the litter.

Range Improvements

The maintenance requirements of the existing range improvements would have an insignificant impact on vegetation.

Threatened or Endangered Species

With livestock use eliminated, impacts to threatened or endangered plant species which may occur in the ES area would be limited to trampling damage by concentrations of wild horses or wildlife species. It is very unlikely that this would happen because the habitats in which these plants occur would not attract concentrations of wild horses or wildlife. No grazing or browsing of the threatened or endangered species by wild horses or wildlife has been observed in areas outside the ES area where these plants have been located (personal communication, Robert Dorn 1978).

TABLE 8-7
WATER CONSUMPTION AND LOSS FROM EVAPORATION UNDER ALTERNATIVE 2

	Acre-Feet of Water Per Year		
	Present	Short Term	Long Term
Livestock Consumption	14	0	0
Wild Horse Consumption	3	1	1
Wildlife Consumption	1	2	2
Evaporative Losses	69	69	69
Total Consumption	87	72	72

TABLE 8-8
TEN-YEAR RECURRENCE RUNOFF BY REPRESENTATIVE DRAINAGES UNDER ALTERNATIVE 2

Allotment and Representative Drainages	Acre-Feet Runoff		
	Present	Short Term	Long Term
Ferris			
(Lost Soldier Creek)	165	110	70
Seven Lakes			
(Stewart Creek)	35	15	15
(Spring Creek)	37	20	20
(Bulls Creek)	28	15	15
(Eagles Nest Draw)	80	30	30
Total	345	190	150

TABLE 8-9
ALTERNATIVE 2: PRESENT PRODUCTION AND KEY SPECIES COMPOSITION COMPARED TO PREDICTED PRODUCTION AND FUTURE KEY SPECIES COMPOSITION IN 1998*

Name of Area and Vegetation Type	Present Production (AUMs)	Predicted Production In 1998** (AUMs)	Present Key Species Composition*** %					Maximum Potential Production (AUMs)****	Future Key Species Composition***** %				
			Agda	Orhy	Artr	Pose	Atnu		Agda	Orhy	Artr	Pose	Atnu
Seven Lakes ES Area	56,101	67,321						98,457					
Sagebrush			9	2	31	2	7		9	2	ND	2	ND
Grass			17	3	11	2	7		17	3	ND	2	ND
Saltbush			0	0	5	0	38		0	0	ND	0	ND
Greasewood			10	8	2	0	28		10	8	ND	0	ND
TOTAL	56,101	67,321						98,457					

*All AUMs expressed on a winter sheep basis.
**Refer to Appendix B-8-3 for the methodology used in determining the predicted production in 1998.
***Refer to Appendix B-8-3 for the methodology used in determining the present key species composition.
****Refer to Appendix B-2-22 for the methodology used in determining maximum potential production.
*****Refer to Appendix B-8-3 for the methodology used in determining the future key species composition in 1998.

ND - no data available to make prediction.

Summary

The overall impact on vegetation from this alternative should be beneficial. While vegetative condition would not change the vegetation would exhibit increased vigor, litter and plant reproduction along with increased production and slight increases in cover.

Impacts on Animals

Terrestrial Wildlife

Pronghorn Populations. With the elimination of livestock use in the ES area, more forage, cover, and space would be available for pronghorn use. Although it is assumed that the big game populations in the ES area could be managed at the levels established by management objectives (Table 2-19), there would be more forage available to support these animal numbers and limited increases in populations. Such increases would be based partly on limiting factors both inside and outside the ES area, proper grazing management, population dynamics, and land use activities.

Pronghorn Food and Cover. The pronghorn habitat would improve over most of the ES area with the elimination of livestock use. Since the most noticeable improvements would occur in the riparian areas, there would be little overall change in the long-term food and cover produced in the crucial winter, fawning, or summer-winter areas. However, the eliminated livestock use would make more forage, cover, and space available for pronghorn use. Thus, the additional free choice of these components would reduce winter mortality and increase fawn production. This would result in limited population increases.

Pronghorn Distribution and Migrations. The elimination of livestock grazing would allow wintering pronghorn to distribute themselves according to forage and cover availability, uninfluenced by the presence of livestock. This would allow these animals to utilize the best available locations to weather-out storms or utilize the preferred forage. Thus, the stress and mortality associated with livestock competition would be eliminated. However, since the effects of such competition are largely unknown or unquantifiable, it is impossible to adequately estimate what this would do to pronghorn populations.

The elimination of livestock grazing would enhance the area for spring and summer use when water was not limiting. Since the meadow areas and grass and forb understories would improve, the long-term spring and early summer use would likely increase, because the animals would be attracted to the better quality habitat.

Mule Deer Populations. With the elimination of livestock grazing in the ES area, mule deer population objectives (Table 2-25) would be met and possibly allow for limited population increases that are deemed environmentally sound.

Mule Deer Food and Cover. The overall condition of the mule deer habitat would be expected to improve with the elimination of livestock. However, since the mule deer habitat is not presently receiving a great deal of livestock use, these areas would not significantly improve over the long-term period.

Competition between mule deer and livestock would be eliminated, making more forage, water, and space available for mule deer use. However, since the effects of such competition are quantitatively unknown (Tueller 1976), it is impossible to estimate what this would do to the deer populations in the ES area.

Mule Deer Distributions and Migrations. With the elimination of livestock grazing, the mule deer would be able to use the crucial winter and winter areas (Map 2-14) without being influenced by the presence of livestock. However, the overall distributions and migration patterns are not expected to change.

Sage Grouse Populations. With the elimination of livestock grazing, sage grouse populations would increase over the long-term period. However, research data are lacking to adequately estimate such increases.

Sage Grouse Food and Cover. The most important factor which would influence sage grouse populations in the ES area is the condition of the meadows and mesic areas. With the elimination of livestock grazing, these areas would greatly improve over the long-term period. As a result, brood production would improve to account for most of the population increases. The strutting-nesting and crucial water areas (refer to Chapter 2) would also improve. Nevertheless, the condition of the meadows would be the major factor influencing population levels.

Sage Grouse Distributions and Migrations. More birds would be attracted to the meadows and mesic areas. However, major shifts in distributions and migrations would not be expected to occur.

Waterfowl Populations. The elimination of livestock grazing would approximately double the present nesting population in the ES area. Kirsh (1969) reported that Slayer (1962) observed approximately twice as many pairs on idle land as he did on moderately or lightly grazed land. In addition, Kirsh (1969) reported 100% greater hatching success in ungrazed than in grazed cover. This would indicate a 200% increase in waterfowl production in the area. Thus, in the Seven Lakes, there would be an 80 pair long-term increase in nesting birds and a 200% long-term increase in brood production.

Waterfowl Food and Cover. Waterfowl food and cover would greatly improve with livestock elimination. Resting, nesting, and brooding cover would improve as emergent and shoreline vegetation would increase over the long-term period. Resident cover, important for waterfowl habitat selection, would improve which would attract more use in the ES area.

Waterfowl Distributions and Migrations. Waterfowl would be found in more reservoirs and along more of the stream courses should livestock be removed.

Nongame Populations. The number (biomass) would remain the same or increase while the diversity of species would decrease as the plant community moves toward climax (Wood 1969). Although there would be a decrease in species diversity, the biomass would increase or remain approximately the same within the ES area. Those species requiring denser cover, would increase, especially in riparian habitat. Those species which require little or no ground cover would decrease. The long-term effect would be a more stabilized ecosystem which would tend to be less likely to fluctuate from year to year, in numbers of animals present. Additional animal species could be found in the ES area, because the niche requirements not now present would be available. The riparian areas would improve, providing an increase in cover, reduction of sunlight, and an increase in insects. These factors would therefore increase the health of the ecosystem.

Nongame Food and Cover. The most significant change that would affect nongame populations could be the improvement of the riparian areas along Crooks Creek and Lost Soldier Creek. With the herbaceous and shrub (willow) layers improving in cover and height, the increased vertical layering of the vegetation would improve the long-term habitat condition. Greater numbers and more species would occur, improving the diversity and production in these areas.

In the broad range types, the increased vegetation cover would provide more nesting, loafing, and escape cover for many species. The numbers and kinds of animals would increase as a result of the long-term improvement of habitat.

Nongame Distributions and Migrations. Since more animals would utilize the improved habitat, there would be a broader distribution of animals over the area, and more animals using the improved riparian areas.

Threatened and Endangered. The black-footed ferret and the peregrine falcon are the two species which may occur in the area.

Black-footed Ferret. With the elimination of livestock grazing, the vegetative cover in the ES area would increase and could reduce the number of white-tailed prairie dogs in the ES area since these rodents are primarily a disclimax species of disturbed grass sites. Thus, over the long-term period, the potential to support any black-footed ferrets which may occur in the ES area would be reduced.

Peregrine Falcon. With the improved vegetation on waterfowl habitats, the increased waterfowl use would provide more prey for peregrine falcons that may occur in the area.

Aquatic Wildlife

Crooks Creek. With the elimination of livestock grazing in the Seven Lakes ES area, the trout fishery on Crooks Creek would undergo immediate recovery on the heavily used areas. There would be a short-term improvement due to stream bank stabilization by vegetation to reduce sedimentation. By the long-term period, the stream would improve from a low fair to a fair condition. A 398% (106/mile to 528/mile) increase in long-term productivity of fish populations would result from improved stream bank morphology, the stream bank stabilization, increased shading by willows, and decreased sediment yields (Wyoming Game and Fish Department 1977b).

Wild Horses

Under the alternative of elimination of livestock grazing, the wild horses' natural movements would not be restricted; so their wild and free-roaming behavior would be preserved. The wild horses would continue to exist and be viewed in a natural setting. Competition with livestock for water, forage, and space would cease. The wild horses would not be disturbed and displaced by domestic grazing animals or related human activity.

In summary, with livestock use eliminated except for incidental trailing use, the net impact to wild horses would be enhanced habitat and population conditions over the short and long term.

Impacts on Cultural Resources

Livestock trailing would cause a slight adverse impact upon surface sites where trampling along drainages would result in the breakage and dislocation of artifacts. If the same trails were used by herds year after year, the impact would be severe.

Intensified human activity in the area as a result of an increased wildlife harvest would be expected. This factor would heighten the risk of vandalism upon cultural sites, causing a severe loss of cultural data.

Impacts on Visual Resources

The beneficial impact from this alternative would be restoration of the natural landscape to its primal state. It would be a long-term visual improvement with benefits recognized in both wildlife and watershed as well as visual setting. The VRM classification would, however, remain unchanged.

Impacts on Recreation

Although it is reported that a slight increase in wildlife populations could occur under this alternative, BLM has no control over whether or not those potential increases would actually occur. Therefore, there is no basis at present to assume that hunting opportunities would be any different than under the present situation. Total visitor days would, under this alternative, be 1,015 by the short term and 1,956 by the long term (see Table 2-42 for a complete breakdown).

Impacts on Wilderness

This alternative would have the effect of removing some of the activities and influences of man from the ES area. This action would enhance the wilderness character of the area and serve to rehabilitate vegetation in former livestock concentration areas. These impacts would occur in both the short term and long term. The overall effect of this alternative would be minimal, however, given the future industrial development described in Chapter 2.

Impacts on Livestock Grazing

Elimination of authorized livestock grazing in the Seven Lakes ES area would terminate the possible use of 341 cattle AUMs and 6,464 sheep AUMs in the Ferris allotment, as well as 2,594 cattle AUMs and 52,104 sheep AUMs in the remaining portions of the ES area. This would cause the estimated loss in production of approximately 380 cattle and 17,975 sheep annually in the ES area. This estimate is based on average nonuse taken by the operators from 1972 through 1976 (Table 1-1) using a 6 month season of use.

None of the fifteen livestock operations are totally dependent upon the Seven Lakes or Ferris allotments for their grazing use. Eight of the fifteen operations presently do not actually run livestock in the ES area—they either take nonuse or lease the base property to which their federal grazing privileges are attached. Elimination of grazing probably would not cause any of the operators to go out of business, but it would hurt all of them. Even though the Seven Lakes ES area contributes a large percentage of grazing for only a few operators, the small percentage contribution the area makes to the remaining active livestock operations is a significant part of each total operation. In most cases, the Seven Lakes ES area grazing use has been used for many years to complement the grazing use of other areas by each livestock operation.

It would be anticipated that the scattered tracts of state and private land in the ES area may no longer be used for grazing if this alternative were selected. The state would lose the income from its grazing lands in the ES area ($1.25/AUM).

Trailing through the ES area would increase because one permittee would need to cross the ES area once in the spring and once in the fall. No allocation of forage for livestock trailing use would be made. Instead, trailing use would be licensed by a trailing permit, would not exceed 5 days, and the livestock would be moved at least 5 miles per day. Trailing would be estimated to be two bands of 2,000 sheep each annually or approximately 133 AUMs (2,000 sheep for 10 days).

Livestock operators north of the ES area would have the same herding problems as identified under Alternative 1 in keeping their livestock out of the ES area.

Impacts on Socioeconomic Conditions

The cancellation of all grazing privileges would have a significant impact on a number of the livestock operators who use the ES area. Basically, the elimination of livestock grazing would require a shift of animals to other lands or would result in the loss of these animals from the productive pool of the region. More animals on nonfederal lands would require more intensive use of private and state owned lands; acreage increases in pastures, harvested forages, and feed grains; more acres in cultivation; and greater dependence on feedlot feeding for meat production. Since only limited acreage is available for development of additional intensive pastures in the region, it is likely that this alternative could, for most of the ES area operators, result in a decrease in the number of livestock approximately equal to the number which could be supported by the lost forage resource.

Currently there are seven livestock operators actively running livestock in the ES area. Three of those operations would be severely decreased in size should this alternative be adopted. Another three of those seven would be significantly impacted by the cancellation of their grazing privileges. Those operations would however remain nearly the same active size. It is believed that these three operations contain grazing privileges outside the ES area which are not now being fully utilized. Activation of the privileges could possibly offset some of the losses due to this alternative. The seventh active operator would not be significantly affected since his ES area privileges constitute only a minor part of his overall ranch operation.

The remaining eight operators are presently taking total nonuse or leasing their base property to which federal grazing privileges are attached. Therefore the cancellation of their privileges would not result in decreased active ranch sizes. It would, however, severely decrease the overall value of the various ranch units, in some cases by nearly 50%. According to some of the ranch owners, the federal grazing privileges would be activated if economic conditions improved. Some ranch owners are currently leasing their private lands to other operators, while some plan to activate the federal grazing privileges leasing base property to other operators. Still others plan to activate the privileges in the coming years in conjunction with BLM's proposed changes in class of livestock. Impacts to inactive ranch operations could be summarized in two categories. First, potential income would be lost, and second, the value of the ranches would be decreased through decreased carrying capacity. One ranch operation would be decreased in size by approximately 6,700 sheep units.

Income

The amount of livestock income which would be lost under this alternative would be equal to that which would be generated under a continuation of the present situation. This loss would be significant to the ES area livestock operators but insignificant in the region. Those operators who are presently in nonuse would lose the ability to activate and thus receive income from their operations. Potential income from sales of ranches would be decreased. Lost livestock income would equal $286,268 in both the short and long term.

Recreation income would be the same as under the present situation. Short-term recreation income would equal $68,178, while long-term recreation income would equal $74,250. The multiplier effect would produce a short and long-term income effect of $70,564 and $76,849, respectively.

Employment

The impact to employment would be the loss of all employment generated by the livestock grazing activities in the ES area. It is estimated that this would amount to 6.73 man equivalents. The losses in employment would occur immediately upon implementation of this alternative and would be felt only in the short term.

Public Finance

It is not possible to determine the amount of lost livestock assessed valuation with this alternative. However, if the livestock AUMs withdrawn from livestock use were not replaced by other feed sources, livestock assessed valuation would be reduced by approximately $75,029, an amount considered insignificant on a regional basis.

Social Well-Being

This alternative would adversely affect the well being of all livestock operators with grazing privileges in the ES area. Some would be affected severely, while others would be affected only to a minor degree. Social well-being outside this group would be only slightly affected.

Socio-Cultural Attitudes

The Seven Lakes ES area operators believe strongly in the social and economic importance of their vocation. They believe that continued grazing of livestock on public lands is in their best interest, the best interest of resource management, and in the best interest of the general public. Input to BLM management framework plan public meetings indicates that the general public embraces that general attitude.

DESCRIPTION OF ALTERNATIVE 3: IMPLEMENTATION OF THE PROPOSED ACTION WITHOUT FENCING

This alternative would be the same as the proposed action described in Chapter 1 except that none of the boundary fences shown on Map 1-3 would be constructed. The proposed action would include 16.3 miles of Type 1 boundary fence, 27.8 miles of let-down boundary fence, 4 cattleguards, and 64 miles of boundary signs. This alternative would eliminate the cattleguards and both types of fence, and increase the boundary signs to 108.1 miles. All other improvements in this alternative would be the same as in the proposed action.

Table 8-10 shows the range improvements proposed under this alternative. Table 8-11 lists the construction and man-power requirements for the projects. Table 8-12 depicts the maintenance needs for the proposed range improvements. Table 8-13 depicts the AMP implementation schedule.

Pasture lines would be defined in all proposed allotments by setting posts with attached signs approximately one-quarter mile apart. The Ferris allotment would require 11.8 miles of pasture boundary marking, the Stewart Creek allotment would require 46.6 miles, and the Cyclone Rim allotment would need 49.7 miles.

ANALYSIS

Impacts on Soils

Impacts would be the same as those identified for the proposed action.

Impacts on Water Resources

The impacts to water resources from this alternative would be identical to those identified for the proposed action.

Impacts on Vegetation

Grazing Management

Short and long-term impacts on vegetation would be essentially the same as those identified for the proposed action.

Range Improvements

The 108.1 miles of pasture boundary signs would remove 10.8 acres from production (108.1 miles x .1 acres per mile disturbed = 10.8 acres). The remaining range improvements identified under this alternative would have the same impacts on the vegetation as those identified for the proposed action.

Threatened or Endangered Species

Impacts would be the same as those identified for the proposed action.

Impacts on Animals

Except for the fencing impacts, the impacts on wildlife from this alternative would be the same as described for the proposed action. The pronghorn movements would be unrestricted as described in Chapter 2.

Wild Horses

Under the alternative of implementing the proposed action without fencing, the wild horses would be able to

TABLE 8-10
PROPOSED RANGE IMPROVEMENTS BY ALLOTMENT FOR ALTERNATIVE 3

Type Improvement	Allotment Ferris	Stewart Creek	Cyclone Rim	Total
Spring Development (number)	0	0	1	1
Water Developments (number)	3	22	10	35
Pasture Boundary Signs* (miles)	11.8	46.6	49.7	108.1
Reservoir Repair	1	0	0	1
Reservoir Fencing (miles)	.3	.8	0	1.1
Pipelines (miles)	0	12	0	12

*These improvements are shared between allotments and are shown in this table as split between two allotments.

TABLE 8-11
ALTERNATIVE 3: CONSTRUCTION AND MAN-POWER REQUIREMENTS FOR THE PROPOSED RANGE IMPROVEMENT PROJECTS

Year	Project	Units	Costs 6/
1	Pasture Boundary Posts 1/	108.1 miles	$ 45/mile
	Spring Developments 2/	1	$ 1,500 each
	Water Develoments 3/	13	$13,570 each
2	Water Developments	9	$13,570 each
3	Water developments	13	$13,570 each
3	Pipelines 4/	12	$ 1,300/mile
4	Reservoir Fencing 5/	1.i miles	$ 1,600/mile

1/ 2 men; 10 miles per day

2/ 2 men; for 10 days each

3/ 4 men; for 14 days each

4/ 2 men; 6 miles per day

5/ 2 men; 3/4 mile per day

6/ includes labor and materials

TABLE 8-12
MAINTENANCE OF PROPOSED RANGE IMRPOVEMENTS FOR ALTERNATIVE 3

Improvement	Number of Units	Annual Maintenance Cost/Unit	Responsibility BLM	Responsibility Operator	Estimated Life of Improvements (Years)
Spring	1	$100	All	0	20+
Wells	35	200	All	0	20+
Pipelines	12 miles	50	All	0	20+
Reservoirs	4	100	All	0	20+

TABLE 8-13
AMP IMPLEMENTATION SCHEDULE FOR ALTERNATIVE 3

	Ferris	Cyclone Rim	Stewart Creek
1	Erect all boundary markers. Develop three water wells. Repair one reservoir.	Develop five water wells. Erect all boundary markers.	Construct six water developments. Erect all boundary markers.
2	Allow all proposed conversion from sheep use to cattle use.	Develop one spring and five water wells. Allow one-third of proposed conversions from sheep use to cattle use.	Allow one-third of proposed conversion from sheep use to cattle use. Construct six water developments.
3	Fully implemented.	Allow one-third of proposed coversions from sheep use to cattle use.	Allow one-third of proposed conversions from sheep use to use to cattle use. Construct ten water developments.
4		Allow one-third of proposed conversions from sheep use to cattle use.	Fence three reservoirs. Allow one-third of proposed conversions from sheep to cattle use.
5		Fully implemented.	Fully implemented.

graze a larger area than they do presently because of the proposed water developments.

This alternative would require extensive herding of cattle; the herders would disturb wild horses while keeping the cattle properly distributed.

Other impacts would be the same as identified for the proposed action.

Impacts on Cultural Resources

With the exception of impacts resulting from fencing, impacts caused by range improvements and grazing treatments upon cultural resources would be the same as those identified for the proposed action.

Impacts on Visual Resources

Three well projects (Hadsell Spring vicinity, Sooner Reservoir vicinity, and the Bairoil vicinity) may cause "sky-lining" in their proposed locations. The remaining long term visual intrusions would be the metallic structures. These structures would be left in their galvanized condition which would contrast with the landscape.

Impacts on Recreation

The impacts to recreation in the ES area under this alternative would be essentially the same as for the proposed action. The one minor difference would result from the lack of fences. Any restrictions to movement by vehicles on any and all two-track trails crossing proposed fences would not be found in this alternative. The difference is minor, however.

Recreation days in hunting under this alternative would be 2,095 in the short term and 2,256 in the long term. The increase over the present situation is due to increases in pronghorn hunting in the ES area.

Impacts on Wilderness

This alternative would create the same basic impacts as those identified for the proposed action with the exception of those associated with fencing. Range improvement projects would be deferred as under the proposed action if it was determined that they would adversely affect lands with wilderness potential. Implementing this alternative in areas with wilderness qualities would have the effect of removing some of those wilderness qualities by increasing the influence and activities of man.

Impacts on Livestock Grazing

Impacts from this alternative in the Ferris, Stewart Creek, and Cyclone Rim allotments due to implementing grazing management systems, adjusting the AUMs, shortening the grazing seasons, allowing conversions in class of livestock, eliminating nonuse, moving sheep bed grounds, developing water sources for livestock, and ear-tagging cattle for identification of ownership would be the same as those identified for the proposed action.

This alternative would require extensive herding efforts be made in the Stewart Creek allotment because no fences would be built to control the movements of the summer cattle even though according to Stoddart, Smith, and Box (1975) "...fencing is almost a necessity..." for cattle rotation grazing systems. Vallentine (1971) stated that, "Intensive and effective management of grazing lands is dependent upon adequate fencing...a fundamental requirement in the management of grazing lands was to provide for control of grazing." He further stated fencing and herding were the only direct methods of controlling grazing animals.

Keeping the cattle in the proper pastures of the Stewart Creek allotment would require daily herding by an estimated two persons on horseback. There would be a tendency for the cattle to drift into the Ferris allotment; this would be especially acute in the autumn. The cattle would also be prone to drift out of the Stewart Creek allotment into the Chain Lakes allotment to the south, and along drainages west into the Cyclone Rim allotment. The open boundary of the Stewart Creek and Cyclone Rim allotments with the checkerboard lands would be unmarked and difficult to follow. This could lead to grazing trespass problems.

Elimination of fencing would cause the cattle operators on the Green Mountain and Arapahoe Creek allotments to extensively herd their livestock to try to prevent them from going into the ES area. This would also require two full-time herders. However, elimination of fencing would cause only slight herding needs in the Cyclone Rim and Ferris allotments by users in these areas.

BLM initiated trepass actions would reduce unauthorized use during the short term and more completely control it in the long term.

In summary, herding cattle under the intensity of this alternative, would be cumbersome from the standpoint of daily livestock operations.

Impacts on Socioeconomic Conditions

From the standpoint of socioeconomic conditions, the impacts for this alternative would be the same as those identified for the proposed action in all but minor ways. Those are described below.

Construction and Maintenance Income

Construction income from this alternative would equal approximately $525,000 and would be generated prior to 1986.

Employment

Employment generated by construction activites would equal approximately eight man equivalents. Long-term employment in the livestock industry in the ES area would equal approximately 19 man equivalents in the short term. This figure would increase by approximately 5% by the long term. Two man equivalents labor would also be required for herding purposes.

DESCRIPTION OF ALTERNATIVE 4: REDUCED LICENSED LIVESTOCK USE WITH ADDITIONAL CONSIDERATION FOR WILDLIFE CRUCIAL AREAS

All livestock operators in the Seven Lakes ES area would have their grazing privileges reduced in proportion to their present adjudicated privileges. Class of livestock conversions would be permitted as in the proposed action.

Authorized livestock use on public land at full implementation of the AMPs under this alternative is shown in Table 8-14.

This level of use was derived in order to analyze the impacts upon all resources from reducing forage available for livestock and making additional forage available for wildlife. Because the lack of certain habitat elements (i.e., food or cover) on crucial areas may be limiting to the vigor and growth of some wildlife populations, the livestock grazing authorized on all identified crucial wildlife areas would be reduced. This alternative represents a reduction of approximately one-half of the use levels on these crucial wildlife areas. Overlays showing locations of these areas are found in the Unit Resource Analysis (URA) of the Seven Lakes Planning Unit. This material is available for public inspection in the Rawlins District BLM Office. The crucial wildlife areas considered were:

Pronghorn crucial winter areas
Pronghorn fawning areas
Sage Grouse crucial winter areas
Raptor nesting areas
Mule Deer crucial winter areas
Sage Grouse strutting areas

The draft herd management area plan (HMAP) and draft habitat management plan (HMP) would be followed as written, and forage allocations for wild horses and wildlife would be made as in the proposed action.

The grazing systems and range improvements in the Ferris and Stewart Creek allotments would remain the same as in the proposed action, but with a lowered intensity of livestock use.

In the Cyclone Rim allotment, a new grazing system would be utilized. There would be no pastures within the allotment. Sheep would graze the allotment from November 1 until March 31 only. There would be no early summer sheep use. Sheep bed grounds would be moved as described in the proposed action. Cattle would graze the Cyclone Rim allotment from November 1 until March 31, but, like the sheep, would not be restricted to certain areas within the allotment except by weather conditions. Water developments would be constructed as in the proposed action. One range study exclosure, 600 feet x 600 feet would be constructed in the SW¼ of the SE¼ of Section 24, T.25N., R.95W. Access would be via an existing two-track trail, and the exclosure would be fenced with a BLM Type 1 fence. Livestock use would be eliminated on the 8.3 acres within the exclosure.

The level of licensed livestock use analyzed in this alternative represents a reduction from present licensed livestock use (refer to Table 8-22). Because there has been considerable nonuse taken in this area (as described in Chapters 1 and 2), the active livestock use of this alternative is higher than the present level of active livestock use. The potential exists under the present situation, however, for livestock operators to activate their licensed AUMs. If this were to happen, livestock use would be approximately 68% higher under the present situation than under this alternative.

ANALYSIS

Impacts on Soils

A slight (less than 0.1 ac ft/sq mi/yr) decrease of sediment yields would be anticipated in the ES area, because surface cover would increase.

Impacts on Water Resources

Water Supply

Under this alternative, water consumption by livestock, as shown in Table 8-15, would increase from 14 to 19 acre feet per year (ac ft/yr). Evaporation losses due to providing water for livestock would increase from 69 to 75 ac ft/yr, or the same amount as for the proposed action. Total consumption and evaporation would increase from 87 to 97 ac ft/yr.

Runoff from 10-year recurrence storms (Table 8-16) would decrease because of an expected increase in vegetative cover. Intensity of use would increase slightly (Appendix B-3-8), but the increase in vegetation is the more dominant factor. The total 10-year recurrence storm runoff from the representative watersheds would decrease from 345 to 217 acre feet by the end of the long term. Runoffs were determined by use of HYMO with infiltration and vegetative cover as inputs (Appendices B-3-1, B-3-2, B-3-8).

Water Quality

With the decrease of storm runoffs, sediment discharges would also be expected to decrease because of the lessened transport ability of runoffs (see Soils). The amount of decrease in sediment discharges is not known because the precise relationship between runoff and sediments is not known. Salinity transported would also decrease because of the decrease in amounts of sediments discharged.

TABLE 8-14
LIVESTOCK USE UNDER ALTERNATIVE 4
(ALL USE IN AUMS EXPRESSED ON A WINTER SHEEP BASIS)

Allotment	AUMs
Ferris	
Summer Cattle	708
Winter Sheep	2,511
Total	3,219
Stewart Creek	
Summer Cattle	6,598
Winter Sheep	3,744
Total	10,342
Cyclone Rim	
Winter Cattle	4,878
Winter Sheep	16,540
Total	21,418
GRAND TOTAL	34,979

TABLE 8-15
WATER CONSUMPTION AND LOSS FROM EVAPORATION UNDER ALTERNATIVE 4

	Acre-Feet of Water Per Year		
	Present	Short Term	Long Term
Livestock Consumption			
Ferris Allotment	2	2	2
Stewart Creek Allotment	2	5	5
Cyclone Rim Allotment	10	12	12
Total	14	19	19
Wild Horse Consumption	3	1	1
Wildlife Consumption	1	2	2
Evaporative Losses	69	75	75
Total	87	97	97

TABLE 8-16
TEN-YEAR RECURRENCE RUNOFF BY REPRESENTATIVE DRAINAGES UNDER ALTERNATIVE 4

Allotment and Representative Drainages	Acre-Feet Runoff		
	Present	Short Term	Long Term
Ferris			
(Lost Soldier Creek)	165	135	110
Stewart Creek			
(Stewart Creek)	35	35	25
(Spring Creek)	37	37	30
(Bulls Creek	28	28	22
Cyclone Rim			
(Eagles Nest Draw)	80	30	30
Total	345	265	217

Impacts on Vegetation

Reducing the grazing privileges of the Seven Lakes ES area operators would not significantly change the production of the vegetation compared to the present level. The grazing systems at the increased intensity of livestock grazing would have the same impacts in the Ferris and Stewart Creek allotments as identified for the proposed action.

Production of the vegetation in the Cyclone Rim allotment would be expected to increase approximately 5% by 1998 due to the lack of grazing during the spring and summer months. Garrison (1972) has shown that the fall and winter seasons are the least detrimental period of utilization of shrubs. The lack of grazing pressure during the growing period would allow the vegetation to increase in vigor, seedling establishment, litter accumulation, and seed production by 1998. Table 8-17 shows the long term impacts in 1998.

The condition of the vegetation in the Cyclone Rim allotment would be expected to improve due to the lack of grazing during the growing period. By 1998, 30% of the acreage in the poor and fair condition classes at present would advance to the next highest condition class while 20% of the acres in good condition at present would advance to excellent condition. In 1998, the acreage in poor, fair, good, and excellent condition classes would be 0, 19,538, 153,824, and 79,524, respectively.

The key species, as stated by Stoddart, Smith, and Box (1975) should be the most important forage species on the range. The reduction in livestock numbers would lessen the grazing pressure on these species. This would allow the key species to produce more seed and establish more seedlings, thus increasing the percentage each species contributes to composition.

The amount of increase would depend upon the season of use and the class of livestock. The species utilized during the winter months and not heavily in the spring, such as sagebrush, would be expected to increase more than a species utilized more heavily during the growing season such as the wheatgrass species.

In the greasewood vegetation type, the key species composition would not be expected to change. Greasewood is of little forage value except for the cured leaves which are eaten in the winter by sheep. Increasing or decreasing the number of livestock would not affect the greasewood vegetation type.

Range Improvements

The impacts of the range improvements on the vegetation in the Ferris and Stewart Creek allotments would be the same as described in Chapter 3.

Range improvements within the Cyclone Rim allotment would remove from production 42.8 acres. The 600 feet x 600 feet exclosure would exclude 8.3 acres from livestock grazing (refer to Appendix B-8-4).

Threatened and Endangered Species

Impacts would be the same as those identified for the proposed action.

Summary

This alternative would result in a long-term improvement in vegetation throughout the ES area. Slight increases in vegetative production would occur Those increases would be accompanied by slight increases in plant vigor and littler accumulation, increased seedling establishment and seed production. Vegetative condition would be improved in the Cyclone Rim allotment.

Impacts on Animals

Terrestrial Wildlife

Forage Allocations. Although the forage allocation in this alternative would be the same as the proposed action, the impacts on wildlife would not be the same as described in Chapter 3. This alternative authorizes more livestock use than is presently occurring in the Stewart Creek and Cyclone Rim allotments, and less livestock use in the Ferris allotment. There would be less forage and cover available for wildlife in the Stewart Creek and Cyclone Rim allotments, and more forage and cover in the Ferris allotment as a result. This would change the free choice aspect of forage and cover selection by wildlife in the ES area.

There would be more than adequate forage allocations made for pronghorn and mule deer to meet population objectives. This alternative should create the potential for limited population increases. These increases would be based partly on limiting factors inside and outside the ES area, proper grazing management, population dynamics, and other competing land uses.

Pronghorn—Grazing Systems.

Ferris Allotment. The pronghorn habitat condition in the Ferris allotment would be expected to improve, as described for the proposed action, with the implementation of this alternative. Thus, the habitat requirements would be met for the population to maintain the present herd management objectives, or the possible increases resulting from the increased available forage.

Since winter sheep use would be reduced by 1,115 AUMs from the present situation, forage competition between livestock and pronghorn would decrease. Winter stress and mortality would probably decrease, but research has not quantified such effects.

The summer cattle use would increase by 370 AUMs, but competition would be negligible since only 68 head would be in the allotment and spatial competition would be minor.

Stewart Creek Allotment. Pronghorn summer habitat would improve as described in Chapter 3, while the winter habitat condition would not be expected to significantly change.

TABLE 8-17
ALTERNATIVE 4: COMPARISON OF FUTURE PRODUCTION AND KEY SPECIES COMPOSITION IN 1998 WITH THE PRESENT AND POTENTIAL PRODUCTION AND PRESENT KEY SPECIES COMPOSITION*

Allotment and Vegetation Types	Present Production (AUMs)**	Predicted Production In 1998 (AUMs)	Potential Production (AUMs)***	Present Key Species Composition**** (%)				Future Key Species Composition (%)			
Ferris	5,625	6,314	12,766	Agda	Orhy	Pose	Artr	Agda	Orhy	Pose	Artr
Sagebrush				16	2	2	29	18	4	4	33
Grass				20	5	2	16	22	7	4	21
Greasewood				10	8	2	T	10	8	2	T
Stewart Creek	19,710	21,704	38,887	Agda	Artr	Orhy	Stco	Agda	Artr	Orhy	Stco
Sagebrush				8	31	4	10	10	36	6	12
Grass				15	9	2	3	17	14	4	5
Cyclone Rim	35,285	37,049	46,804	Atnu	Cela	Artr	Agsp	Atnu	Cela	Artr	Agsp
Sagebrush				7	3	19	12	11	6	24	14
Grass				7	1	11	1	11	4	16	3
Saltbush				38	1	5	0	41	4	10	0
Greasewood				28	T	2	T	28	T	2	T
TOTAL	60,620	65,067	98,457								

*All AUMs are expressed in a winter sheep basis.
**Refer to Appendix B-2-7 for methodology in determining the present forage production.
***Refer to Appendix B-2-22 for methodology in determining the potential production.
****T=Trace

The increased cattle use (5,184 AUMs) would decrease the available spring and summer herbaceous forage for pronghorn use. However, since the livestock would be at 50% of the present adjusted carrying capacity, adequate forage would be available over most of the broad range types. Thus, pronghorn populations would be able to meet the 1980 management objectives or undergo limited population increases.

The winter sheep use proposed in this alternative would be expected to have insignificant impacts above the present situation since this alternative would increase sheep use by only 809 AUMs.

Cyclone Rim Allotment. The pronghorn habitat condition would be affected the same as described for the proposed action.

The increased winter cattle and sheep use would reduce the available forage on the crucial pronghorn winter ranges. However, since livestock grazing would be only at 50%-60% of the livestock grazing capacity, there would be enough available forage for pronghorn under most conditions. Problems would arise in severe storm situations when the disturbance of the winter sheep would reduce the available forage and cover for pronghorn use. Although the increased sheep use would be expected to slightly increase the pronghorn stress and mortality, research has not quantitatively assessed such impacts.

Thus, there would be enough available forage and cover to support the long-term management objectives or some limited increases.

Pronghorn—Fences. The fences in this alternative would affect pronghorn the same as described for the proposed action.

Pronghorn—Water. The water developments would impact the pronghorn the same as described for the proposed action.

Pronghorn—Summary. The reduced livestock use in the Ferris allotment would make more forage available to support wintering pronghorn. However, the increased livestock use in the Stewart Creek and Cyclone Rim allotments would reduce presently available forage in these two allotments but would more than adequately provide the forage to support the populations desired in the management objectives. The water developments would provide habitat to support an additional 300 to 800 animals during the summer period. The proposed fences would increase the risk to lose migrating pronghorn during severe storm conditions. A significant but unquantifiable number of animals could be killed due to the combined effects of the storm and the weather should the fence be up when such a storm occurred.

Mule Deer—Grazing Systems. The mule deer habitat condition would be affected the same as described for the proposed action.

Ferris Allotment. The amount of available forage and cover would be greater in the long term than is presently available since the livestock use would be reduced in the allotment. Competition would be reduced with the lower sheep numbers. Therefore, slight population increases would occur, but the lack of research data does not permit an adequate estimate of such increases.

Stewart Creek Allotment. The increased cattle use would not significantly affect the mule deer in this allotment since the proposed cattle use is only 64% of the grazing capacity. Therefore, there should be adequate forage to support the present deer management objectives in the allotment. Since the spring and summer range appears to be limiting in this area, the increased use of the winter range would not seriously limit these populations.

Cyclone Rim Allotment. The livestock use proposed for this alternative would not significantly limit the deer populations in this allotment since the livestock use would be 52% (cattle) and 69% (sheep) of the livestock grazing capacity. Since adequate year-round range is limiting the population in this allotment, the increased use over the present situation could not significantly affect the mule deer population in this area.

Mule Deer—Fences. The fences would affect the mule deer the same as described for the proposed action.

Mule Deer—Water. The water developments would affect the mule deer the same as described for the proposed action.

Mule Deer—Summary. The proposed grazing systems would not be expected to appreciably alter the present mule deer winter range vegetative condition or significantly change the present populations.

The proposed fences would not be expected to significantly affect the deer in the ES area. However, the proposed water developments may provide additional mule deer habitat in the summer and fall, and allow for slight population increases in those areas.

Sage Grouse—Grazing Systems.

Ferris Allotment. This alternative level of livestock use would slightly improve the meadow and low-lying mesic areas in this allotment. As a result, the important brood habitat along Lost Soldier Creek, in Bull Springs, and the other mesic areas would improve. Brood production would increase, over the long-term period, but it is not possible to quantitatively estimate such increases with existing research data. The strutting-nesting and crucial winter habitats would be affected the same as described for the proposed action.

Stewart Creek Allotment. The brooding habitat along Stewart Creek, Chicken Springs, and other mesic areas would improve from the growing season rest. Thus, these areas would improve in brood production. However, as explained for the Ferris, it is not possible to estimate the affect on brood production. The strutting-nesting and crucial winter habitats would be affected the same as described for the proposed action.

Cyclone Rim Allotment. With the elimination of summer sheep and cattle use, the important brood habitat along Lost Creek and in the springs and mesic areas would show great improvement in cover and competition.

The improvement in these areas would allow for increased brood production over the long-term period. Again, this cannot be quantitatively estimated.

By 1998, the strutting-nesting habitat would improve with the increased cover and production in the grass-forb layer. This increased residual cover would improve nesting success and provide for more forage.

The crucial winter ranges along Lost Creek would not be significantly reduced by the winter livestock use since the sheep and cattle would be evenly distributed over the allotment, weather permitting.

Sage Grouse—Water Developments. The proposed water developments would affect the sage grouse the same as described for the proposed action.

Sage Grouse—Summary. The strutting-nesting habitats in the ES area would improve as a result of better grass and forb production. The crucial winter habitats would remain in their present condition classes, while the brooding habitats in the meadow areas would be improved over the long-term period. Nesting success and brood production would improve, but it is not possible to estimate the population increases due to a lack of research data.

Waterfowl. The impacts on waterfowl would be the same as described for the proposed action.

Nongame—Grazing Systems. The proposed levels of livestock grazing in this alternative would reduce the presently available nongame cover and forage by 9,010 winter sheep AUMs. For many animals, as this food and cover is consumed by livestock, the habitat quality is reduced. Some animals would shift distribution patterns or be exposed to increased predation. The numbers of individuals and the diversity of species would be reduced in the short term as forage is consumed, but there would be a rebounding increase between the short term and long term as the grazing systems allow the initial forage loss to be replaced by increased forage production.

The riparian areas, which are the most important habitats for nongame birds and mammals, would be affected as described in Chapter 3. Although the level of use would be less in this alternative than in the proposed action, the effect of livestock congregating in these areas would provide the same impacts.

Nongame—Range Improvements. The range improvements would affect the nongame wildlife the same as described for the proposed action.

Aquatic Wildlife

Grazing Systems. The grazing systems would affect the aquatic habitats the same as described for the proposed action.

Threatened and Endangered

The black-footed ferret and the American peregrine falcon are the two endangered species which may occur in the ES area. This alternative would affect these animals the same as described for the proposed action.

Impact Summary

The reduced livestock use in the Ferris allotment would make more forage available for wintering pronghorn. However, the increased livestock use in the Stewart Creek and Cyclone Rim allotments would reduce presently available forage in these two allotments. However, there would be enough forage allocated to meet the 1980 management objectives and allow for some limited population increases. Significant big game population increases would not be expected because limiting factors (primarily the winter habitat) exist partly outside the ES area, and because we make the assumption that the Wyoming Game and Fish Department will manage for their stated population objectives. Mule deer populations would not be changed. Sage grouse would increase by an unquantifiable amount over the long-term period. Waterfowl, nongame, threatened and endangered, and aquatic wildlife would be affected the same as described for the proposed action. The proposed range improvements would affect the wildlife populations the same as described for the proposed action.

Wild Horses

Wild horses would be impacted both at the short and long term by the increased livestock use under this alternative. There would be more competition for feed and water, and possibly more harassment.

Impacts on Cultural Resources

Under this alternative, impacts caused by range improvements and grazing treatments upon cultural resources would be the same as in the proposed action.

The proposed range study exclosure (600 feet x 600 feet) in the Cyclone Rim allotment would preclude any trampling damage to cultural resources within this area; however, construction of the Type 1 fence around the plot may cause slight damage to subsurface sites if they occur. There may also be moderate damage caused by cattle trailing along the fenceline around the exclosure.

Impacts on Visual Resources

The impacts due to this alternative would be the same as those identified for the proposed action.

Impacts on Recreation

Impacts to recreation activities under this alternative would be the same as under the proposed action. As in the proposed action, pronghorn hunting would increase. Total visitor days associated with hunting would be 2,095 in the short term and 2,256 in the long term.

Impacts on Wilderness

The impacts associated with this alternative would be basically the same as those identified for the proposed action. Livestock use under this alternative would be less than the proposed action. This would have a positive but minimal effect on the wilderness resources compared to the proposed action.

Impacts on Livestock Grazing

Under this alternative, there would be an increase in livestock numbers over the existing situtation (because nonuse would be activated). Livestock operators in the Ferris allotment would have their total federal adjudicated animal unit months (AUMs) reduced from 6,805 to 2,799 and would be able to run approximately 68 cattle and 2,511 sheep. In the Stewart Creek and Cyclone Rim allotments, federal grazing privileges would be reduced to 10,778 cattle and 18,877 sheep AUMs. Approximately 723 cattle and an average of 3,744 sheep would graze the Stewart Creek allotment, while an estimated 692 cattle and 16,540 sheep would graze in the Cyclone Rim allotment annually (Table 8-1).

In all three allotments, with fewer licensed AUMs and nonuse eliminated, the sheep operators would simply run the size bands they normally would, usually from 1,200 to 2,500 head but for a shorter period of time. Those operators with too few sheep grazing privileges to run an economic size band (less than 1,200 sheep) would combine their sheep with those of other operators to make economic size bands. By contrast, most cattle operators would run fewer head for the entire grazing period. These impacts would impact the social-economic status of the livestock operators through the long term. Remaining impacts would be the same as those identified for the proposed action.

Impacts on Socioeconomic Conditions

Implementation of Alternative 4 would have significant impacts on a number of the ES area operators. Basically it would cut the ES area livestock operators' licensed livestock forage by a significant amount. The active operators would have to shift animals to other lands or cut back the size of their operations. Shifts to other lands, if available, would require more intensive use of those lands. Acreages in pastures would have to be increased, and greater dependence on feedlot feeding, or more harvested forages would be required. If these shifts could not be made, the overall size in terms of active animal units of the individual livestock operations would be decreased. This would not only decrease rancher income, but would decrease ranch value as well.

Ranch operators whose public land grazing privileges are in nonuse would lose the potential to activate part of those privileges. Furthermore, part of the value of their ranches would be lost.

Income from livestock operations under this alternative would be greater than under the present situation. Both short and long term livestock income would be $435,666. The income multiplier would produce a total income effect of $710,571. Construction income would be the same as under the proposed action, as would wild horses values. Income resulting from recreational activities would be the same under this alternative as under the proposed action.

Employment

Employment generated under this alternative by livestock operations would amount to 12.06 man equivalents per year through the 20-year analysis period. This amounts to an employment situation relatively the same as under the present situation. The difference between the above level and the present situation is insignificant.

Public Finance

This alternative would make a contribution to total assessed valuation in the region somewhat higher than under the present situation. The amount would equal $67,745 (see methodology in Appendix B-3-7). Compared to the total regional assessed valuation, the difference between the present situation and this alternative is insignificant.

Social Well-Being

This alternative would have no impact on social well-being in the region. The impact of this alternative on the ES area livestock operators would be negative and in some cases, significant. These impacts would occur in the short term and continue to the long term.

Socio-Cultural Attitudes

The Seven Lakes ES area operators believe strongly in the social and economic importance of their vocation. They believe that continued grazing of livestock on public lands is in their best interest, the best interest of resource management, and in the best interest of the general public. Input to BLM Management Framework Plan public meetings indicate that the general public embraces that basic attitude. This alternative is contrary to the above attitudes.

DESCRIPTION OF ALTERNATIVE 5: LIVESTOCK GRAZING AT THE LEVEL OF PROPOSED ACTION WITH NO CHANGES IN CLASS OF LIVESTOCK

Under this alternative, the grazing use level in terms of winter sheep AUMs would stay the same as it would be under the proposed action. The livestock operators would not be permitted to change their existing class of livestock. It is assumed all AUMs would be actively used each year and that nonuse would be eliminated. Forage reservations for wild horses and wildlife would be made as in the proposed action.

Fencing would be the same as in the proposed action. However, fewer water developments would be constructed. Specifically, those water developments in the

Ferris and Cyclone Rim allotments would remain the same as in the proposed action. In the Stewart Creek allotment, only water developments designated as 1, ME-1, ME-2, ME-3, 9, 8, 11, and 16 would be constructed (Map 8-2). The first four would be built the first year, and the last four the second year.

Because no conversion to cattle would be permitted, a grazing system different from the proposed action would be followed. The existing Seven Lakes allotment would not be split into two allotments, although the two cattle operators (4,770 winter sheep AUMs) would be required to keep their stock east of the Crooks Gap-Wamsutter Road. Their grazing area would be split into two parts by the Township 25-26 North Line. The first year and during subsequent odd numbered years they would both turn out in the northern part on June 1, and through herding, keep their cattle in that part until August 1. Then, the cattle would be driven into the southern part where they would remain until the end of the grazing season (November 1). The township line, approximately 11.5 miles long, would be marked with pasture boundary signs spaced every quarter-mile, as described in the proposed action. In even numbered years, starting with the second year, the cattle would be turned out in the southern pasture where they would remain until August 1. Herding would be used to keep the stock in the proper area. After August 1, the cattle would be moved into the northern pasture for the remainder of the season.

Winter sheep operators (44,330 winter sheep AUMs) would graze their sheep from October 15 until March 31. They would be required to turn out in the northern one-half of the Seven Lakes allotment, and to graze there when weather permitted. Thus, during an average winter, the northern half of the allotment (Townships 25, 26, and 27 North) should receive 50% of the grazing pressure. Bed grounds would be moved as in the proposed action.

Summer sheep (1,735 AUMs) would graze from June 1 until August 1. The summer sheep would be required to stay west of the 94 Range West line and north of Township 24 North. Bed grounds would be moved as in the proposed action.

Both cattle (642 winter sheep AUMs) and sheep (4,253 winter sheep AUMs) grazing distribution in the Ferris allotment would not be changed from the present situation except for the elimination of nonuse. Dates for Ferris allotment grazing would be the same as in the proposed action.

ANALYSIS

Impacts on Soils

Implementation of Alternative 5 would result in a slight (less than 0.1 acre foot per square mile per year—ac ft/sq mi/yr) decrease in sediment yields in the Ferris allotment because of the predicted cover increase. The Cyclone Rim and Stewart Creek allotment should have a slight increase in sediment yields (less than 0.1 ac ft/sq mi/yr) because of the anticipated cover decrease.

Impacts on Water Resources

Water Supply

Water consumption by livestock under this alternative would increase from 14 to 26 acre feet per year (ac ft/yr) (Table 8-18). This increase would be due to the increase in livestock numbers. Evaporation losses due to providing livestock water would increase from 69 to 74 ac ft/yr. This would be due to new water developments. Total water use and evaporation would increase from 87 to 102 ac ft/yr.

Ten-year recurrence runoffs (Table 8-19) in the Ferris allotment would decrease because of the expected increase of vegetative cover. The streams in the Seven Lakes allotment would have an increase over the long term in 10-year storm runoff because of a decrease in vegetative cover. Eagles Nest Draw would at first have a decrease in expected runoff because of elimination of summer cattle grazing in that area, but then with a predicted decrease of vegetation, expected runoffs would increase. Runoffs were determined by use of HYMO with infiltration and vegetative cover as inputs (Appendices B-3-1, B-3-2, B-3-8).

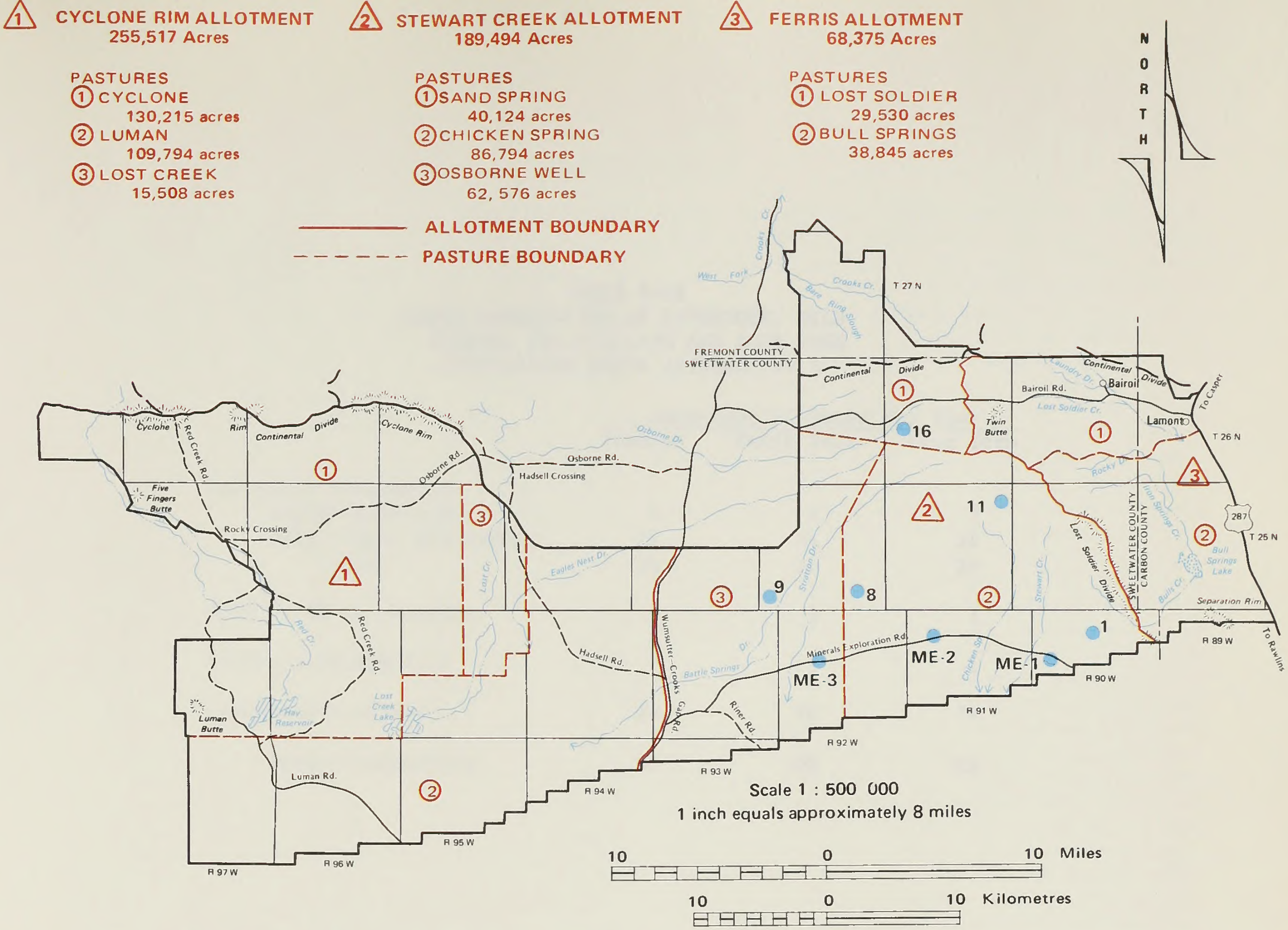
Water Quality

Sediment discharges would decrease in the Ferris and increase in the Seven Lakes because of the expected changes in runoffs. The amount of change in sediment discharges is not precisely known since relationships with runoff are not completely known. Salinity transported would respond the same as sediments since the two are related, as was seen in the USGS study of the Seven Lakes ES area in 1976.

Impacts on Vegetation

Grazing during the fall, winter, or dormant season is considered to be the least detrimental to the vegetation. Cook and Stoddart (1963) concluded that desert ranges are best adapted to winter grazing. They found that 50% herbage removal during the winter (January 1) caused a 5.7% mortality in plants and an 11.6% reduction in crown cover of live plants. The same intensity of herbage removal during the spring (May 1) caused a 13.5% mortality of plants and 20.3% reduction in crown cover of live plants. Mueggler (n.d.) has shown that fall grazing neither benefited nor was detrimental to the vegetation.

Defoliation in the winter and again in the spring at only moderate intensities is considered deleterious to plant welfare (Cook and Child 1971, Cook and Stoddart 1963). Harvesting during the winter and again during the late spring for three successive years killed an average of 29% of the plants (Cook and Stoddart 1963). Grazing



LEGEND

● LOCATION OF WATER DEVELOPMENT INCLUDING IDENTIFYING NOMENCLATURE

PROPOSED WATER DEVELOPMENTS FOR ALTERNATIVE FIVE

Seven Lakes Grazing

Environmental Statement

Map 8 - 2

TABLE 8-18
WATER CONSUMPTION OF LIVESTOCK, WILD HORSES, AND WILDLIFE AND LOSS FROM EVAPORATION UNDER ALTERNATIVE 5

	Acre-Feet of Water Per Year Present	 Short Term	 Long Term
Livestock Consumption			
Ferris Allotment	2	2	2
Seven Lakes Allotment	12	24	24
Total	14	26	26
Wild Horse Consumption	3	1	1
Wildlife Consumption	1	1	1
Evaporative Losses	69	74	74
Total Consumption	87	102	102

TABLE 8-19
TEN-YEAR RECURRENCE RUNOFF BY REPRESENTATIVE DRAINAGES UNDER ALTERNATIVE 5

Allotment and Representative Drainages	Acre-Feet Runoff Present	 Short Term	 Long Term
Ferris			
(Lost Soldier Creek)	165	150	125
Seven Lakes			
(Stewart Creek)	35	55	65
(Spring Creek)	37	55	70
(Bulls Creek)	28	40	55
(Eagles Nest Draw)	80	70	90
Total	345	370	405

during these two seasons would take place approximately one-half of the time. The remaining half of the time, grazing would take place on the southern half of the allotment during fall and winter months.

The entire Seven Lakes allotment would receive a rest for 2 months, April and May. Cook and Stoddart (1963) state that desert ranges in the Intermountain region generally start growth in late March. Therefore, the 2 months of rest would be beneficial to the vegetation in terms of increased vigor and seedling establishment.

Short and long-term impacts for the Ferris allotment would be the same as those identified for the proposed action. Short-term impacts for both the Ferris and Seven Lakes allotments are shown in Table 8-20.

Long-term impacts expected in 1998 are shown in Table 8-21. The cover percentage of the Cyclone Rim and Stewart Creek allotments would be expected to decrease approximately 2% due to the detrimental grazing during the winter and later spring.

The condition of the vegetation in the Seven Lakes allotment would decline as a result of the grazing during the winter and following spring. The mortality of the vegetation, as stated by Cook and Stoddart and the 2% decrease in ground cover, would result from the grazing during the winter and following spring. Twenty-five percent of the acreage in good and excellent condition classes would decline to the next lowest condition class while 20% of the acreage in fair condition would decline. In 1998, the acreage in poor, fair, good, and excellent condition in the Seven Lakes allotment would be 14,385, 132,199, 259,030, and 36,066, respectively.

Range Improvements

Impacts to vegetation as a result of range improvements would be the same as those identified for the proposed action, except those caused by water developments. Under this alternative, there would be 21 water developments disturbing 1.8 acres per development. This would total to 37.8 acres removed from production. The total acres removed from production as a result of range improvements would be 125.7.

Threatened or Endangered Species

Impacts would be the same as those identified for the proposed action.

Summary

This alternative would cause a decline in vegetative production by the long term. This would be accompanied by changes in vegetative species composition throughout the area.

Impacts on Animals

Terrestrial Wildlife

Pronghorn—Grazing Systems. The level of livestock use proposed for this alternative would cause a long-term degradation of habitat quality over the ES area. Since there would be an estimated 8% reduction in vegetation production by 1998 (refer to Vegetation section), the availability of forage for pronghorn use would be less. This reduction in available forage would increase the competition between livestock and pronghorn, which would produce more stress and mortality in the wintering pronghorn during severe storm conditions. However, the extent of such stress and mortality is not possible to predict with available research data.

Perhaps the most important factor effecting pronghorn from this alternative grazing level would be the increased number of sheep in the ES area. Taylor (1975) noted that fences had reduced the availability of historic winter ranges by about one-half and that competition with livestock further reduced critical forage. The proposed 158% increase in sheep use over the existing situation in the Seven Lakes could only compound this problem. Although adequate forage has been reserved for most normal snow years, in winters of excessive snow and limited available forage and cover, competition could be serious.

This increased livestock use would represent a loss of presently available pronghorn forage. However, based on the forage allocations, population objectives would be met (Table 2-19).

Taylor (1975) also observed sheep and pronghorn relationships. He noted that pronghorn were neutral to sheep and cattle when the animals were scattered, but avoided concentrated herds of either species. The presence of the herder, dogs, bells, camp tenders, and moving of camps overrode the reaction that pronghorn might have had to sheep alone.

Under this alternative, the number of sheep bands (and thus the herders, dogs, etc.) would be increased from 9 to 30 bands in the ES area. Thus, the amount of available habitat would be reduced. Since the herders would be expected to make camps in the preferred areas, pronghorn would not be able to use these areas. In severe storm conditions, this could be a serious factor influencing pronghorn mortality as these animals are forced into less preferred areas. The increased number of sheep bands could only complicate this problem. However, as previously stated, the research data do not provide a basis for a quantitative estimation of such losses.

Pronghorn—Fences. The proposed fences would impact pronghorn the same as described for the proposed action.

Pronghorn—Water Developments. The proposed water developments would make about 193,400 acres available for summer pronghorn use. Thus, it is estimated that an increase of 280 to 750 pronghorn would yearly use these watered areas in the summer and early fall by 1998.

Pronghorn—Summary. The forage allocations would be sufficient to support the pronghorn populations desired for the area. However, this increased sheep use represents a loss of presently available forage and usable habitat. Pronghorn habitat condition would be degraded

TABLE 8-20
ALTERNATIVE 5: SHORT-TERM IMPACTS BY SEASON OF USE BY ALLOTMENT

Allotment Name	Season of Use	Short-term Impacts in 1986
Ferris	Graze from May 15 until seedripe of key species (August 1), then rest until winter grazing (November 1).	Graze: Vigor, seed production, litter accumulation reduced. Rest: Vigor, seed production, litter accumulation increased. Some seedling establishment.
	Rest until seedripe of key species (August 1), then graze to trample seed into soil until October 31.	Rest: Vigor, seed production increased. Litter accumulation increased.
	Graze season-long through the winter (November 1-March 31).	Vigor, litter accumulation reduced.
Seven Lakes	Grazing from October 15 to March 31 followed by grazing from June 1 to August 1.	Vigor, seed production, litter accumulation reduced. Seedling establishment reduced. Mortality of plants increased.
	Grazing from October 15 to March 31.	Vigor, litter accumulation reduced.
	Grazing from August 1 to November 1.	Vigor, seed production, litter accumulation remains the same.
	Rest from April 1 to May 31.	Vigor, seed production, litter accumulation, seedling establishement increased.

TABLE 8-21
ALTERNATIVE 5: COMPARISON OF PRESENT AND POTENTIAL PRODUCTION AND PRESENT KEY SPECIES COMPOSITION WITH PREDICTED PRODUCTION AND FUTURE KEY SPECIES COMPOSITION IN 1998*

Allotment Name	Present Production (AUMs)	Predicted Production (AUMs)**	Potential Production (AUMs)	Present Key Species Composition (%)				Future Key Species Composition (%)**			
Ferris	5,625	6,305	12,766	Agda	Orhy	Pose	Artr	Agda	Orhy	Pose	Artr
Sagebrush				16	2	2	29	26	0	5	10
Grass				20	5	5	16	30	0	5	0
Greasewood				10	8	2	T	10	8	2	T
Seven Lakes	54,995	49,496	85,691								
Grass				15	10	7	2	15	10	10	5
Saltbush				-	5	38	-	-	5	30	-
Greasewood				-	2	28	-	-	5	30	-
ES TOTAL	60,620	55,801	98,457								

*AUMs are expressed in a winter sheep basis.
**See Appendix B-8-6 for methodology of calculating predicted production in 1998 and identifying future key species composition in 1998.

over most of the area, reducing the quality of the ES area for pronghorn use.

Water developments would provide suitable habitat to support an additonal 280-750 pronghorn during the summer and fall seasons. The proposed fences would increase the risk of significant mortality to the migrating pronghorn herds in the ES area.

Mule Deer—Grazing Systems. The level of livestock use proposed in this alternative would degrade the mule deer winter habitat by the long-term period. The decreased production (see Vegetation section) would make less forage available for mule deer by 1998. Although mule deer are not a major consumer of forage in the ES area, the increased sheep consumption of forage combined with decreased forage availability may increase mule deer winter mortality. However, since spring and summer habitat is believed to be limiting, the increased livestock use on the winter ranges may not significantly affect these animals. Thus, the mule deer population in the ES area is expected to remain at its present level through the long-term period.

Mule Deer—Fences. The fences would affect the mule deer the same as described for the proposed action.

Mule Deer—Water Developments. The water developments in the Stewart Creek allotment would not affect mule deer in the ES area since no new developments would be constructed within the normal winter or yearlong ranges. The water developments in the Ferris and Cyclone Rim allotments would affect the mule deer the same as described for the proposed action.

Sage Grouse—Grazing Systems. The grazing systems proposed in this alternative would cause a long-term degradation of sage grouse strutting-nesting habitat. The decreased production in the grass-forb layer would lower the habitat quality by reducing nesting and brooding cover. The crucial winter areas and draws would remain in their present condition.

The brooding habitat in the meadows would maintain its present poor condition in the Ferris allotment. In the Seven Lakes allotment, the brooding habitat along Stewart Creek would remain in its present condition, while the brooding habitat along Lost Creek, and near Lost Creek reservoir and Hay Reservoir areas would see a downward trend from the increased sheep use. Brood production would suffer in these areas over the long-term period.

Sage Grouse—Water Developments. The proposed water developments would make approximately 193,375 acres available for sage grouse use in the summer. Although the developments would provide late summer water, it is believed that since it is the succulent vegetation around natural water that is the main benefit to sage grouse, these proposed developments would not significantly increase sage grouse populations.

Waterfowl. The impacts on waterfowl would be the same as described for the proposed action.

Nongame—Grazing Schedule. With the decreased production in the grass-forb layer, there would be a decrease in the quality of nongame habitat over the long-term period. As the availability of forage and cover lessens, the broad range types would be less attractive to many bird species. The number of individuals and the overall species diversity would be reduced.

The riparian areas, which contain the greatest concentration of different species and numbers of individuals, would not be significantly changed from the present situation, since the cattle would be expected to congregate in these areas. The meadow areas which attract many animals would remain the same in the Ferris and east of the Wamsutter-Crooks Gap Road, and would see a downward trend west of this road. There would be a corresponding change in nongame use in these areas.

Nongame—Range Improvements. The nongame species would be affected by the range improvements the same as described for the proposed action.

Threatened and Endangered Species

Black-footed Ferret. The deteriorated range condition may improve the habitat for white-tailed prairie dogs which may respond to the earlier successional stage resulting from heavy range use (Clark 1968). This would improve the amount of available prey for any unidentified black-footed ferret which may occur in the ES area.

American Peregrine Falcon. This endangered raptor would be affected the same as described for the proposed action.

Aquatic Wildlife

These habitats and animals would be affected the same as described for the proposed action.

Impact Summary

The deteriorated range condition would degrade the quality of habitat for pronghorn, mule deer, sage grouse, and most nongame birds by 1998. The increased sheep use (158%) would reduce the available forage and cover for pronghorn, and increase the risk of winter mortality by direct competition and lowered carrying capacity. However, population objectives would be met based on the allocated forage.

The fences would provide a risk to a substantial but unquantifiable number of pronghorn the same as described for the proposed action.

The proposed water developments would make about 193,400 acres available for summer pronghorn use. This summer range would support 280 to 750 pronghorn yearly over the long-term period. Other animals would also benefit from the additional water.

Wild Horses

The impacts to wild horses from Alternative 5 would primarily differ from the proposed action in that there would be less competition for forage simply because under this alternative, conversions to cattle would not take place. Therefore, even though the level of livestock use under Alternative 5 would equal the level of the proposed action, there would be proportionately fewer cattle and more sheep. Olsen and Hansen (1977) showed that wild horses in the Red Desert west of the Seven Lakes ES area had diets more similar to cattle (45%) than to domestic sheep (27%). Because forage competition would be lessened, dietary free choice would be enhanced.

However, the competition with sheep would occur mostly during the winter months when less forage would be available. The estimated 40,302 winter sheep (Table 8-1) which would graze the Seven Lakes allotment would also exclude the wild horses as well as wildlife from protected areas during severe winter weather, leading to probable, but unquantifiable, losses.

In the Stewart Creek area eight water developments would be constructed. Therefore, some areas would remain too distant from water to be grazed by wild horses, and since water would continue to be limited in some areas, competition for water between horses and livestock, and horses and wildlife, would continue.

The grazing system proposed for this alternative in the Seven Lakes would not create measurable impacts to wild horses. The period of no competition (April and May) would be beneficial to wild horses, yet research is lacking to show the ramifications of diminished livestock competition to wild horses.

Other impacts to wild horses would be the same as described for the proposed action.

Impacts on Cultural Resources

Under this alternative, impacts from range improvements would be the same as those outlined in Chapter 3 except for the construction of only 8 of the 22 proposed water developments, (Stewart Creek area) and a change in pasture boundary markers. Severe trampling would occur around the 8 proposed water developments since livestock use would be more concentrated. All of the proposed pasture boundary markers would be eliminated, and a new line of markers would span 11.5 miles of the T.25N./T.26N. township line. These boundary markers would not physically or visually impact any known cultural sites.

Although the amount of AUMs in use under this alternative would be the same as in the proposed action, different proportions of livestock classes and different grazing seasons would change the impacts to cultural resources considerably.

In the Stewart Creek area and Ferris allotment, present cattle use would continue (2,381 AUMs). The initial impact to cultural resources in these two allotments would remain the same as described for the proposed action; however, as sheep grazing increases in the area (moving to the elimination of all present nonuse), widespread trampling would occur. Since all sheep grazing in the Stewart Creek area and Ferris allotment would occur during the winter months (October 15-March 31) trampling damage to cultural resources would be minimal except at bedding grounds where it would be severe.

In the Cyclone Rim area, the greatest use would be from winter sheep grazing. Trampling damage to cultural resources would occur at sheep bed grounds and in draws where sheepherders would concentrate their animals to protect them from winds.

In the area north of T.24N. and west of R.94W., sheep (918 AUMs) would be pastured during the summer months (June 1-August 1). Impacts from trampling would become severe around the four water developments in this area, at bed grounds, and in draws since protection offered by the frozen ground and snow cover would be gone.

Impacts on Visual Resources

The impacts due to this alternative would be the same as those due to the proposed action.

Impacts on Recreation

The impacts due to this alternative would be the same as those due to the proposed action.

Impacts on Wilderness

Since this alternative includes fewer range improvements than the proposed action, fewer impacts would result. However, the impacts under this alternative are of the same type; the difference is only one of intensity.

Range improvements under this alternative would be deferred if it was determined that they would adversely affect lands with wilderness potential.

Impacts on Livestock Grazing

This alternative would have a major impact to the six livestock operators in the Seven Lakes incommon allotment and the one in the Ferris allotment who requested that they be allowed to change from their existing class of sheep to either summer cattle or a combination of winter sheep and winter or summer cattle. These operators feel that such a change would benefit them economically, and that lack of such a change would leave them in an economically untenable position, at least as far as grazing in the Seven Lakes ES area is concerned.

Sheep raising is declining at a rapid pace in the Seven Lakes ES area, and elsewhere. Sheepmen cited by Stevens and Hartley (1976) gave high predator losses, a shortage of good hired labor, poor lamb prices, and the age of the owner as the dominant reasons for leaving the sheep business. They also pointed out that of 339 Wyoming sheepmen who left the business between 1968 and 1974, 72% shifted their resources to cattle production, 20% sold or leased their resources to cattlemen, 5% sold their resources for non-agricultural uses, and only 3% sold or leased their resources to sheepmen. Cattle production was the main enterprise chosen because it requires less labor and because predators rarely bother cattle. Therefore, this alternative would by the long term result in the operators who requested conversions no longer having livestock operations in the ES area. Cattlemen could not acquire the federal grazing privileges of the sheepmen; therefore it is possible these AUMs (24,496 in the Seven Lakes allotment and 742 in the Ferris allotment) would no longer be used by livestock, assuming present market conditions continue.

The sheep operators in the ES area who did not request conversions in class of livestock would benefit from the lessened competition of the other sheep operators for space, food, and water by the long term.

Impacts on Socioeconomic Conditions

Under this alternative, total income from the ES area would be greater than that under the present situation. This assumes, of course, that all licensed livestock forage was in active use through the long term. Livestock income would be equal to $740,313 in both the short term and long term. Construction income would equal approximately $450,000. Recreation income would be equal to that identified for the proposed action. The value associated with wild horses would also be the same as for the proposed action. The multiplier effect would produce a total income effect of $1,278,000 in the short term (1986) and $1,284,300 in the long term.

One of the principal reasons the level of nonuse is so high in the Seven Lakes ES area at the present time is the general decline of the sheep industry in Wyoming. The area has previously been predominately a sheep grazing area and only limited cattle grazing has been permitted. The decline of Wyoming's sheep industry has been well documented (Stevens and Hartley 1976). Principal reasons given for the decline are; predation, the difficulty in obtaining labor (sheep herders), age of the operators, poor prices for sheep and wool, and more attractive profits in the cattle industry. With these facts in mind, it must be concluded that it would be very difficult for the ES area operators to activate all of the sheep AUMs and keep them active through the duration of the analysis period of this ES, 1978-1998.

Employment

If all livestock forage was activated, 24 man equivalents labor would be generated in both the short term and long term. The figure would be less if the operators were unable to activate the livestock forage.

Social Well-Being

Impacts to social well-being would be confined to the group of ES area livestock operators. These would be adverse impacts to livestock operators' income and ranching lifestyles and would occur in both the short and long term.

Socio-Cultural Attitudes

Any decision adversely affecting the ES area livestock operators would be contrary to prevailing public attitudes. This alternative would not be favorably received, because it could appear to the livestock operators to be without a rational foundation.

DESCRIPTION OF ALTERNATIVE 6: THE PROPOSED ACTION WITH ADDITIONAL FENCING

The alternative is simply the proposed action with all allotment boundaries and most pasture boundaries fenced. The interior pasture lines of the Cyclone Rim allotment would not be fenced, but would be delineated with pasture boundary signs. All other pasture boundaries would be fenced.

All fences would be constructed to BLM Type 1 specifications. However, every mile, a gate would be left open when no cattle were being grazed in the adjacent pastures to permit wild horse and pronghorn migrations. This alternative would require an estimated 104 miles of fence in addition to the fencing in the proposed action. Maintenance would be done to BLM standards by the permittees in each allotment.

The three reservoirs proposed to be fenced in the Stewart Creek allotment and the one (Whitewater Reservoir) proposed for repair and fencing in the Ferris allotment would be fenced and repaired as in the proposed action. However, in each case, the entire reservoir and dam would be enclosed by a BLM Type 1 fence. A pipe would be laid through the earthen dam to a trough outside the fence. Equipped with a float shut-off valve, the trough would supply drinking water for livestock, wild horses, and wildlife (Figure 8-2).

ANALYSIS

Impacts on Soils

Implementation of this alternative would have the same impacts as those identified for the proposed action.

Impacts on Water Resources

The impacts to water resources from this alternative would be identical to those for the proposed action.

Impacts on Vegetation

Short and long-term impacts to terrestrial vegetation would be the same as those identified for the proposed action.

Range Improvements

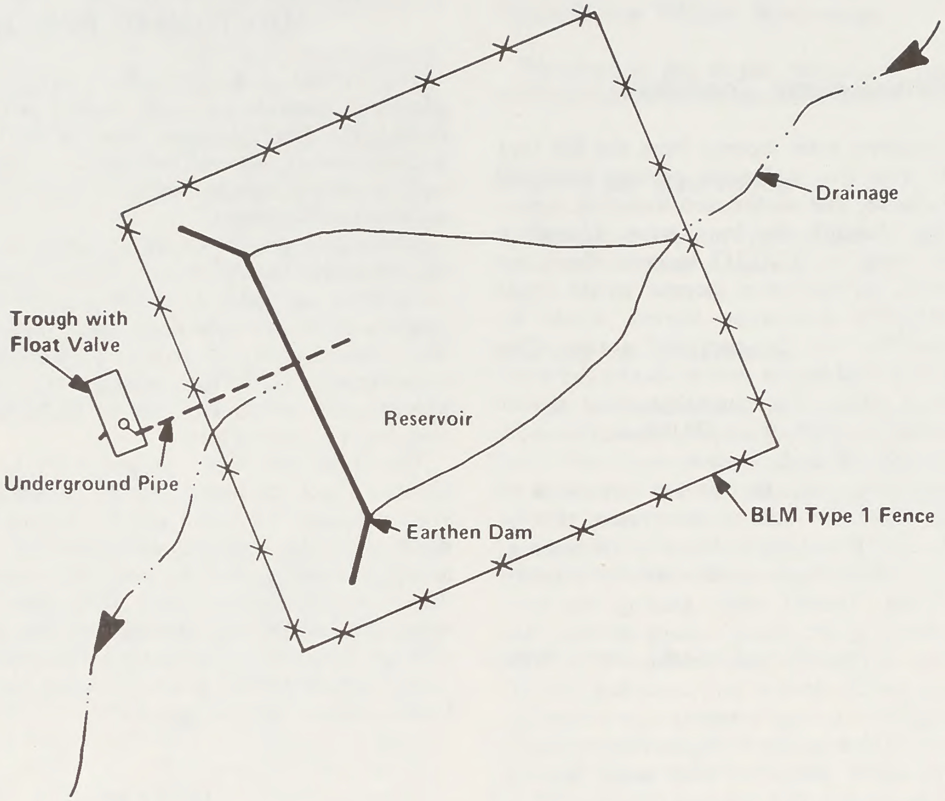


Figure 8-2
PROPOSED RESERVOIR DESIGN FOR ALTERNATIVE 6

The additional 104 miles of fence would remove 156 acres from production at the short term and long term. The total acres removed from production by BLM Type 1 fences would be 222 acres.

The "sacrifice area", from which most vegetation is removed as described in Chapter 3, would be evident around the water troughs which accompany the three reservoirs proposed to be fenced in the Stewart Creek allotment and the one (Whitewater Reservoir) proposed for repair in the Ferris allotment.

Thirty-eight miles of pasture boundary signs proposed for the Cyclone Rim allotment would remove 2.8 acres from production in the short term and long term. The remaining range improvements would have impacts identical to those identified for the proposed action.

Threatened or Endangered Species

Impacts would be the same as those identified for the proposed action.

Impacts on Animals

Except for the additional pasture fencing and the reservoir fencing proposed in this alternative, the impacts would be the same as those identified for the proposed action.

Fencing

As summarized in Chapter 3, fences have been very detrimental to pronghorn populations in the Red Desert. In 1972 a combination of severe storms and fencing increased winter mortality from a normal of 15% to an estimated 61.8% of the herd. This accounted for a 3,111 animal loss above normal winter mortality. Although it is virtually impossible to differentiate between losses induced directly by the storm, by the fences, or by a combination of the two, it was noted that mortality in fenced areas was twice that of the unfenced areas. Although woven wire and five-barbed wire fences made up the majority of fences in the study area, during periods of heavy snow cover and adverse weather conditions, observations indicated that all fence types were detrimental to pronghorn movement (Riddle and Oakley 1972). It was further stated that, "Since fencing in the study area resulted in greater mortality, it can only be concluded that more fencing in the area would increase mortality under similar circumstances".

In his study of the Red Desert pronghorn carrying capacity, Taylor (1975) concluded that fencing alone reduced pronghorn carrying capacity by 28.4%. He stated that Wyoming Game and Fish Department data indicated that nearly one-half of the historic winter ranges were unusable because of livestock fencing. Furthermore, he said that livestock and highway fences greatly limit the ability of pronghorn to adjust their distribution in relation to seasonal forage availability.

In the Seven Lakes ES area, the proposed fences would further compound the problem of restricted pronghorn movement and severe winter losses. These fences would only add to a proven hazardous situation, increasing the risk of winter storm-fencing mortality while reducing the availability of limiting winter range.

These fences would not be particularly detrimental during periods of little or no snow. It must be stressed that these animals are highly mobile and migratory because of the seasonal variability in the availability of forage and cover. It is imperative that these animals be able to freely move into areas of available winter range. If fences restrict this ability to move between available areas, the herd can face serious mortality. The fence between Bull Springs and Lost Soldier pastures would be particularly detrimental in this sense, since it would pass through the middle of a crucial winter area for about 1,000 wintering pronghorn. If the 1971 winter storm-fencing mortalities are an indicator of possible losses, substantial but unquantifiable losses could result from the fence combined with a severe winter storm.

The other allotment and boundary fences would add further to the risk of pronghorn winter mortality. As stated for the proposed action, substantial but unquantifiable numbers of animals could be lost due to these fences. More fences could only increase these losses. Thus, considering the importance of free winter movement and access to winter range, these fences would create the potential to lose a substantial number of animals wintering in the ES area.

Reservoir Fencing. The proposed fencing of the four reservoirs would improve the nesting, brooding, and roosting cover for waterfowl and many other game and nongame animals. Kirsh (1969) indicated a doubling of nesting success on ungrazed nesting habitat. The same results could be expected for these fenced areas.

Sage grouse brooding habitat would also be expected to improve as a result of the reservoir fencing. Brood production should improve. However, population increases are impossible to predict with existing data.

Wild Horses

The alternative of the proposed action with the addition of all pasture boundaries being fenced would impact the wild horses by restricting their natural movements. This problem would be especially acute in the proposed Cyclone Rim allotment along Cyclone Ridge which splits a wild horse concentration area, and in the proposed Stewart Creek allotment where the fences cut the natural horse concentration area into thirds. The fences would therefore exclude wild horses from part of their range in the Seven Lakes ES area for most of the year or cause the number of horses on each side of a pasture fence to be so small as to lead to inbreeding problems. Horse populations would be kept from mixing during the breeding season by these fences. The fences could also cause injuries and some unquantifiable mortalities to wild horses, and at times, block wild horse access to water, feed, and shelter during the short and long term.

During the times cattle would be out of the pastures and the gates opened, the wild horses would negotiate the open gates without impacts.

The reservoir design (Figure 8-2) of this alternative would provide wild horses good quality water. Maintenance of fences by the permittees would mean that the fences would be tighter and in better condition, and thus more difficult for wild horses to negotiate.

Other impacts to wild horses from this alternative would be the same as those identified for the proposed action.

Impacts on Cultural Resources

Under this alternative, impacts from range improvements and grazing treatments would be the same as those identified by the proposed action, with the exception of 104 miles of additional fencing along pasture and allotment boundaries. This would cause the same type and degree of impacts to cultural resources as for the proposed action for fencing, but the impacts would be more spatially extensive.

Construction of this additional fencing would possibly cause more severe impacts to sites 48SW117 and 48SW613. These sites would be close enough to the fencelines to suffer impacts from livestock trailing, two-track vehicle trails, and increased vandalism.

The method of reservoir fencing under this alternative would also change from the proposed action. Under this alternative the entire reservoir would be fenced, so that the trampling impacts would be moderate.

Impacts on Visual Resources

The impacts to visual resources from this alternative would be essentially the same as those from the proposed action. The additional fencing would create minor localized impacts to visual resources.

Impacts on Recreation

Alternative 6 calls for the construction of 148 miles of pasture and allotment boundary fence and installation of four cattleguards on major travel routes. Approximately every mile, a gate would allow access to the next pasture. Cattleguards would not be placed on the unimproved routes or seismic lines which are occasionally used by recreationists. The absence of these cattleguards on the unimproved routes would restrict access and in turn affect use patterns. The gates would compensate for the absence of cattleguards.

Hunters would experience some impact from this alternative. Being forced to detour through gates would be more of a minor inconvenience than an impact, however.

Hunting of pronghorn and sage grouse, in terms of total recreation days, would be the same as identified for the proposed action.

Open space values would be adversely impacted by this alternative in both the short and long term.

Impacts on Wilderness

This alternative would cause adverse impacts to lands with wilderness qualities in the ES area. These impacts, caused by construction of range improvements, would increase the influence and activities of man in the area. The additional fencing proposed under this alternative, coupled with other range improvements, would adversely affect the wilderness potential if the current program identifies wilderness study areas in the ES area. Should any such areas be identified, any range improvements which would adversely affect wilderness quality would be deferred.

Impacts on Livestock Grazing

Cattle operators would experience identical impacts to those identified for the proposed action, except that by having the pasture boundaries fenced, herding costs of the operators would be significantly reduced, and problems of cattle drifting into adjacent allotments and checkerboard lands would be minimized. Vallentine (1971) stated that effective managment of grazing lands is dependent upon adequate fencing.

Leaving the fence gates closed until the cattle are no longer in the pastures would reduce cattle herding and gathering costs, especially if late fall storms occurred.

The fencing proposed under this alternative would not have much of an impact upon the sheep operators because the pastures would be quite large (for example, the Chicken Springs pasture encompasses more than 135 square miles) and the sheep would continue to be herded, although limited herderless management of the sheep may be attempted at times to reduce labor costs. The fenced boundary in the Ferris allotment between the two pastures and the fenced boundary between the Chicken Springs and Osborne Well pastures in the Stewart Creek allotment would become minor obstacles to winter sheep herding and could cause slightly increased winter and storm losses. Other impacts to sheep grazing would be as described for the proposed action.

Because the permittees in each allotment would be required to do the fence maintenance, this would slightly increase their operating costs.

The proposed water developments of this alternative would provide good quality water to livestock because the cattle and other large animals would not be able to walk in the reservoir area, thus stirring up the bottom, possibly breaking the bottom seal.

Impacts on Socioeconomic Conditions

Impacts from this alternative would be very nearly the same as those identified for the proposed action. The principal difference would be that construction income would be significantly higher. Total construction income under this alternative would be approximately $750,000.

ALTERNATIVES

The additional fencing, under this alternative, would decrease the herding requirements shown for the proposed action and other alternatives.

The proposed fencing would be contrary to prevailing open space attitudes.

The comparison of long-term impacts due to implementation of the proposed action and alternatives are summarized in Table 8-22.

TABLE 8-22
SUMMARY COMPARISION OF LONG-TERM IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES*

Resource	Component	Present	Proposed Action	Alternatives					
				1 No Action	2 No Grazing	3 No Fencing	4 Mid-Level	5 No Change Livestock Class	6 Additional Fencing
Water	Water consumption ac ft/yr	87	105	86	72	105	97	102	105
	Storm runoff ac ft	345	266	310	150	266	217	405	266
Vegetation	Total Production**	60,620	64,707	60,620	67,321	64,707	65,067	55,801	64,707
Condition	Excellent	49,350	127,205	53,812	49,350	127,205	129,687	44,420	127,205
	Good	357,712	302,029	349,470	357,712	302,029	302,846	288,799	302,029
	Fair	96,296	74,671	100,076	96,296	74,671	71,902	158,270	74,671
	Poor	4,305	3,758	4,305	4,305	3,758	3,228	16,174	3,758
Wildlife	Available Forage (AUMs)	33,688	3,434	33,688	59,657	3,434	24,678	3,434	3,434
	Pronghorn Populations *** (Winter)	3,800	5,000	5,000	5,000	5,000	5,000	5,000	5,000
	(Summer)	2,205	2,205	2,205	2,205	2,205	2,205	2,205	2,205
	Mule Deer *** (Yearlong)	175	175	175	175	175	175	175	175
	Sage Grouse	850-1,200	850-1,200	850-1,200	850-1,200	850-1,200	850-1,200	850-1,200	850-1,200
	Waterfowl (Nesting)	40 pairs	45-50	40 pairs	80 pairs	45-50	45-50	45-50	45-50
	Aquatic Brook Trout	106/mile	106/mile	69/mile	528/mile	106/mile	106/mile	106/mile	106/mile

TABLE 8-22 (CONTINUED)
SUMMARY COMPARISON OF LONG-TERM IMPACTS OF
THE PROPOSED ACTION AND ALTERNATIVES

				Alternatives					
Resource	Component	Present	Proposed Action	1 No Action	2 No Grazing	3 No Fencing	4 Mid-Level	5 No Change Livestock Class	6 Additional Fencing
Wildlife Habitat Condition (Acres)	Pronghorn Summer								
	Good	41,137	43,059	No Change	43,986	43,059	43,109	31,270	43,059
	Fair	358,159	372,390	No Change	397,410	372,390	372,390	345,167	372,390
	Poor	113,558	97,335	No Change	71,458	97,355	97,355	136,417	97,355
	Pronghorn Crucial Winter								
	Good	12,563	9,792	No Change	Improved but no change in condition class****	9,792	No Change	10,650	9,792
	Fair	127,173	129,572	No Change		129,572	No Change	116,773	129,572
	Poor	15,393	15,765	No Change		15,765	No Change	27,915	15,765
	Mule Deer Crucial Winter								
	Good	2,550	Improved but no change in condition class****	No Change	Improved but no change in condition class****	Improved but no change in condition class****	No Change	Degraded but no change in condition class****	Improved but no change in condition class****
	Fair	16,471		No Change			No Change		
	Poor	5,698		No Change			No Change		
	Mule Deer Winter - Yearlong								
	Good	39,069	Improved but no change in condtion class****	No Change	Improved but no change in condition class****	Improved but no change in condition class****	No Change	Degraded but no change in condition class****	Improved but no change in condition class****
	Fair	56,115		No Change			No Change		
	Poor	6,936		No Change			No Change		
	Sage Grouse Nesting-Strutting								
	Good	4,058	Improved but no change in condition class****	No Change	Improved but no change in condition class****	Improved but no change in condition class****	Improved but no change in condition class****	Degraded but no change in condition class****	Improved but no change in condition class****
	Fair	39,172		No Change					
	Poor	8,881		No Change					
	Sage Grouse Winter								
	Good	2,142	Improved but no change in condition class****	No Change	Improved but no change in condition class****	Improved but no change in condition class****	No Change	No Change	Improved but no change in condition class****
	Fair	10,180		No Change			No Change	No Change	
	Poor	1,000		No Change			No Change	No Change	

TABLE 8-22 (CONTINUED)
SUMMARY COMPARISON OF LONG-TERM IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

				Alternatives					
Resource	Component	Present	Proposed Action	1 No Action	2 No Grazing	3 No Fencing	4 Mid-Level	5 No Change Livestock Class	6 Additional Fencing
Wild Horses	Population	240	135	240	135	135	135	135	135
	Free-Roaming Nature	Slight	-Low	Slight	+None	-Slight	-Low	-Low	-Moderate
Cultural Resources	Archeologic	-Low	-Severe	-Low	-Low	-Severe	-Severe	-Severe	-Severe
	Historic	-Low	-Severe	-Low	+Low	-Severe	-Severe	-Severe	-Severe
Recreation	Hunter Days/Yr	1,956/yr	2,256/yr	1,956/yr	1,956/yr	2,256/yr	2,256/yr	2,256/yr	2,256/yr
Livestock	AUMs Licensed*****	58,687	54,869	22,288	133	54,869	34,979	55,730	54,869
	AUMs Actual Use	26,105	54,869	22,288	133	54,869	34,979	55,730	54,869
Socioeconomic	Total	$360,578	$718,136	$360,578	$ 74,250	$718,136	$535,383	$840,030	$718,136
	Livestock Income	286,268	618,419	286,268	0	618,419	435,666	740,313	618,419
	Recreation Income	74,250	99,717	74,250	74,250	99,717	99,717	99,717	99,717
	Lost Income ($)	N/A	N/A	N/A	286,268	N/A	N/A	N/A	N/A

*Where magnitude of adverse (-) or beneficial (+) impact is unknown or unquantifiable, the following ranges are used: Slight = 0%-10% Low - 11%-30% Moderate = 31%-75% or more. Ther percentages are for comparative purposes only and do not identify an absolute quantity of impacts.

**Properly usable, suitable AUMs on winter sheep basis.

***The pronghorn and mule deer populations are the same for the proposed action and all alternatives because they represent the management objectives stated in the Wyoming Game and Fish Department's Strategic Plan. It is assumed that these levels would be maintained through harvest.

****Improvements and degradations of habitat condition where the change is not enough to cause a shift of habitat acres from one condition class to another.

*****Licensed use includes both active use and nonuse of federal, private and state AUMs. In the proposed action, and in Alternatives 3, 4, 5 and 6, this use has been expressed in terms of winter sheep AUMs by using the appropriate conversion factors.

CHAPTER 9

CONSULTATION AND COORDINATION

Team Organization

The Seven Lakes Environmental Statement (ES) team was organized on June 27, 1977, at the Bureau of Land Management (BLM) District Office, in Rawlins, Wyoming. The team consisted of specialists in: soils, water resources, vegetation, wildlife, wild horses, visual resources, recreation, livestock grazing, cultural resources, socioeconomics, and geology.

Consultation and Coordination in Preparation of the Proposed Action

Some consultation efforts preceded the team's assembly. Meetings were held in Rawlins during the fall and winter of 1976 and the spring of 1977 with the livestock operators and interested groups. Livestock operators were notified by letter of the meetings, which were intended to explain the background and significance of the ES to them as users of public lands, including the court action and subsequent agreement (Chapter 1, Background section). These informational meetings were followed during the spring of 1977 by sessions between the allotment management plan (AMP) writers and individual users or use groups to determine the future livestock operation plans and needs in the Seven Lakes ES area. An open house was held on June 2, 1977 to inform the public on the management framework plan (MFP) and a formal public hearing was also held on the same day to record public comment and develop a record of testimony as to the proposed decisions contained in the MFP.

Draft AMPs were completed in July of 1977, and were made available for review by livestock operators and public interest groups. Livestock operators, the Wyoming Game and Fish Department, and other interest groups reviewed the drafts during the summer of 1977 and expressed their views on the proposed action (Table 9-1).

The proposed action as stated in Chapter 1 includes pertinent information from the proposed AMPs. As previously stated, these plans were prepared after consultations with the Seven Lakes area livestock operators on their future plans and needs in the area.

The AMPs remain unsigned and in draft form until a final decision is made on which of the various management options will be used in the area. That decision will be made by the BLM after consideration of the environmental impacts that each alternative would have on the area.

Various aspects of land use, resource management, and other activities in the Seven Lakes area are directly or indirectly included in memoranda of agreement or understanding between BLM and county, state, and other federal agencies.

Consultation and Coordination in Preparation of the Draft Environmental Statement

A news release was distributed August 1, 1977. The public announcement of intent to prepare the Seven Lakes ES and to inform the public as to the beginning of the ES was distributed to news media throughout the state of Wyoming. The purpose of the release was to obtain public input into the Seven Lakes ES. At the same time, letters and explanatory material were sent to various interest groups and individuals, federal agencies, state and local agencies, and congressional delegations, inviting them to take part in the ES process by supplying comments and information.

Groups, organizations, and individuals contacted by letter at this time included: wildlife interest groups, environmental groups, cultural organizations, recreational groups, livestock organizations, livestock operators, wild horse organizations, federal agencies, and the Wyoming Governor's clearinghouse.

Further comments are expected from the public through formal statements and informal contacts as the ES is developed. Many individuals with special knowledge and expertise have been consulted during the preparation of portions of the ES, and their input is noted in Table 9-1.

Coordination With Other Agencies

The BLM has submitted descriptions of one archeological and one historical site (both within the ES area) to the State Historic Preservation Officer (SHPO). The purpose was to establish eligibility of these sites for possible nomination to the National Register of Historic Places.

Determination was made that the sites were eligible for nomination and the BLM is in the process of conducting consultation required under provisions of Section 106 of the National Historic Preservation Act (P.L. 89-665) and Executive Order 11593.

TABLE 9-1

COORDINATION WITH AGENCIES, ORGANIZATIONS, AND INDIVIDUALS

	Requested Data for Planning System Up-Date (URA)	Data Received	Requested Input for Planning System De-cision (MFP)	Input Received	Nature of Contact During ES Preparation	Action Taken to ES Contact
Local Agencies:						
Carbon County Commission			X	X		
Carbon County Planning & Zoning			X	X	Reviewed county land use plans to determine compatibility with livestock use of the ES area.	Livestock plans for the ES area are compatible with the county land use plans.
Sweetwater Planning & Zoning			X	X		
Fremont County Planning & Zoning					Reviewed county land use plans to determine compatibility with livestock use of the ES area.	Livestock plans for the ES area are compatible with the county land use plans.
State Agencies:						
Governor's Clearinghouse						
Recreation Commission	X	X				
State Historic Preservation Officer	X	X			Requested list of updated National Historic Sites.	The list of National Historic Sites was up-dated for the ES area.
State Engineer	X	X				
State Highway Department	X	X	X	X		
Department of Environmental Quality (DEQ)	X	X	X	X		
Wyoming Game and Fish Department	X	X	X	X	Information on population estimates and habitat criteria was requested.	Population estimates and habitat criteria from the Fish and Game Department was used.
Department of Agriculture			X	X		Were asked about predator control and native species and responded to their questions.

TABLE 9-1 (CONTINUED)
COORDINATION WITH AGENCIES, ORGANIZATIONS, AND INDIVIDUALS

	Requested Data for Planning System Up-Date (URA)	Data Received	Requested Input for Planning System De-cision (MFP)	Input Received	Nature of Contact During ES Preparation	Action Taken to ES Contact
Federal Agencies:						
National Oceanographic & Atmospheric Administration (NOAA)					Asked for an annual climatic summary of the ES area.	Climatic information was received and used.
Bureau of Reclamation	X	X				
National Park Service	X	X				
Congressional Delegation						
Fish and Wildlife Service			X		Inquiry was made as to what programs the Fish and Wildlife Service might have in the ES area.	A predator control program is in progress in western half of the ES area.
Geological Survey	X	X	X	X		
Nuclear Regulatory Commission	X	X				
Energy Research & Development Administration	X	X			An inquiry was made as to possible energy related projects in the ES area.	ERDA responded as to a possible coal gasification plant in the ES area.
Soil Conservation Service					An inquiry was made to determine method for initial stocking and range condition.	Method for determining range condition and initial stocking rate used.
Forest Service					Checked with the Forest Service to see if ES operators used Forest Service grazing privileges.	Several operators in the ES area use Forest Service grazing privileges.
Other Organizations:						
(Rawlins)						
Roughriders Snowmobile Club	X	X	X	X		
(Jeffery City)						
Snowrunners Snowmobile Club	X	X	X	X		

TABLE 9-1 (CONTINUED)
COORDINATION WITH AGENCIES, ORGANIZATIONS, AND INDIVIDUALS

	Requested Data for Planning System Up-Date (URA)	Data Received	Requested Input for Planning System De-cision (MFP)	Input Received	Nature of Contact During ES Preparation	Action Taken to ES Contact
(Lander)						
Snowdrifters	X	X				
Rawlins Rockhound Gem & Mineral	X	X				
Fremont County Audubon Society			X	X		
Wyoming Wildlife Federation			X	X		
Friends of the Earth			X	X		
National Audubon Society			X	X		
Carbon County Conservation Club			X	X		
Sierra Club			X	X		
Wilderness Society			X	X		
Wyoming Outdoor Council			X	X		
Colorado State University					Contacted the range department concerning grazing systems.	We used the suggestions of the range department on grazing systems.
Rawlins District Multiple Use Group	X	X	X	X		
First Wyoming Bank					How range improvements affect rancher borrowing ability.	Range improvements will make ranch financing easier.

Formal consultation under Section 7 of the Endangered Species Act of 1973, with the U. S. Fish and Wildlife Service, was initiated in March 1978.

Coordination in the Review of the Draft Environmental Statement

Comments on the draft environmental statement will be requested from agencies and interest groups listed in Table 9-2. Copies of the draft environmental statement will be available for public inspection at the BLM offices listed below:

Bureau of Land Management
P. O. Box 1928
2515 Warren Avenue
Cheyenne, Wyoming 82001

Bureau of Land Management
P. O. Box 670
1300 Third Street
Rawlins, Wyoming 82301

TABLE 9-2
AGENCIES AND ORGANIZATIONS FROM WHOM COMMENTS WILL BE REQUESTED

Federal Agencies

Environmental Protection Agency
National Advisory Council on Historic Preservation
Nuclear Regulatory Commission

Department of Agriculture
    U.S. Forest Service
    Soil Conservation Service

Department of the Interior
    U.S. Fish and Wildlife Service
    Heritage Conservation and Recreation Service
    Bureau of Mines
    National Park Service
    Bureau of Reclamation
    U.S. Geological Survey

State Agencies

Governor's Clearinghouse*

Local Government

Mayor of Rawlins
Carbon, Fremont, and Sweetwater County Commissioners and Planning and Zoning Commissions

Other Organizations

Natural Resources Defense Council (NRDC)
Public Lands Council
Wyoming Stockgrowers Association
Wyoming Woolgrowers Association
The Wildlife Society, Wyoming Chapter
Sierra Club
Old West Rangeland Monitoring Project
Wild Horse Organized Assistance, Inc. (WHOA)
Wyoming Wildlife Federation
Friends of the Earth
Wyoming Outdoor Council
Carbon County Conservation Club
Fremont County Audubon Society
National Audubon Society
Izaak Walton League

*Distributes to State Agencies

TABLE 9-2
AGENCIES AND ORGANIZATIONS FROM WHOM COMMENTS WILL BE REQUESTED

Other Organizations (Continued)

Council for Agricultural Science and Technology (CAST)
Wilderness Society
Defenders of Wildlife
Wyoming Historical Society
Wyoming Farm Bureau
American Horse Protection Association
Carbon County Farm Bureau
University of Wyoming
International Society for the Protection of Mustangs and Burros
Carbon County Extension Service
Society for Range Management
National Wildlife Federation
American Sheep Producers
National Mustang Association
National Wild Horse Association

APPENDIX B

B-1-1	Methods used for computations of forage reservation
B-1-2	Legislative provisions for protection of cultural resources
B-1-3	Grazing use assumptions
B-1-4	Range suitability standards for Seven Lakes
B-2-1	Soils classification system
B-2-2	Soil site productivity potentials
B-2-3	Range site descriptions
B-2-4	Soil and wind erodability
B-2-5	Method for determining evaporation losses from reservoirs
B-2-6	Determination of Visual Resource Management (VRM) classes
B-2-7	Description of methodology used to determine the forage production in the Seven Lakes ES area
B-2-8	Wildlife condition
B-2-9	Range trend form
B-2-10	Range condition
B-2-11	Nongame, smallgame wildlife observed in the ES area
B-2-12	Representative wildlife of the Seven Lakes ES area
B-2-13	Aquatic habitat evaluation procedures
B-2-14	Methodology used in determining future key species composition
B-2-15	Explanation of current level of livestock use
B-2-16	Apparent trend of pronghorn habitat
B-2-17	Scientific and common names of plants
B-2-18	Sediment yield factor rating
B-2-19	Range transects in ES area
B-2-20	Soil mapping units in the Seven Lakes ES area
B-2-21	General properties of the soils in each map unit
B-2-22	Description of methodology used to determine maximum potential forage production
B-2-23	Regional Cultural Resource Sampling Design (Metcalf, 1976)
B-3-1	Development of HYMO: Surface Runoff and Soil Loss Estimates of the Northeastern Great Divide Basin using HYMO
B-3-2	Determination of runoff by use of infiltration rates
B-3-3	Method for determining evaporation losses
B-3-4	Methodology used in determination of present key species composition
B-3-5	Methods of computing affected area
B-3-6	Proper allocation of livestock competitive forage for wild horses
B-3-7	Socioeconomic analysis
B-3-8	Method of determining intensity of grazing
B-3-9	Methodology for determining future key species composition in 1998
B-3-10	Methodology for predicting range condition
B-3-11	Pronghorn AUMs available with water development
B-3-12	Determination of future wildlife habitat condition
B-4-1	Effectiveness of let-down fence
B-8-1	Breakdown of AUMs under the proposed alternative of elimination of livestock grazing
B-8-3	Methodology used in determining predicted production in 1998: Alternative 2 Methodology used in determining present key species composition: Alternative 2 Methodology used in determining future key species composition in 1998: Alternative 2
B-8-4	Methodology used in determining acreage disturbed by range improvements
B-8-5	Distribution of federal AUMs under Alternative 1
B-8-6	Methodology used in determining predicted production in 1998: Alternative 5
B-8-7	Methodology used in determining the acreage within each condition class in 1998: Alternative 1

APPENDIX B-1-1

Methods Used For Computations of Forage Reservation

A. Method of Computing Wildlife Forage Reservation

1. All wildlife numbers used were provided by Wyoming Game and Fish and are their management goals.

2. Numbers by species are as follows:

a. *Pronghorn*

(1) Some 5,000 use the ES area for 6 months, approximately November through April. It is assumed that all pronghorn move out of the Arapahoe allotment at this time because of heavy snows.

(2) Some 1,339 use the ES area for 6 months, approximately May through October. The figure given BLM by the Wyoming Game and Fish Department for the Seven Lakes Planning Unit was 1,800. The Ferris allotment is said, by the Wyoming Game and Fish Department, to have 360 of these. The 1,440 remaining are in the Arapahoe, Stewart Creek, and Cyclone Rim allotments. Since no better data are available, the number in Stewart Creek and Cyclone Rim is derived by proportioning the pronghorn among the allotments according to the forage available in each allotment. This method shows 979 pronghorn through the summer in the Cyclone Rim and Stewart Creek allotments combined. Adding this number to the 360 in the Ferris allotment gives a total of 1,339 pronghorn in the ES area through the summer.

b. *Mule Deer*

(1) Some 175 mule deer use the ES area year-round.

3. All forage is expressed in AUMs on a winter sheep basis.

4. The methods used to determine the forage allocation for each of the two wildlife species were as follows:

a. *Pronghorn*

$$\frac{(a\text{x}b)(c)}{d} + \frac{(e\text{x}b)(c)}{d} = \text{Winter Sheep AUMs used by pronghorn,}$$

where a = 5,000 pronghorn in the ES area through the winter, b = 6 months,

c = .098, the fractional diet similarity between yearlong pronghorn and winter sheep as observed by Hansen (1975) in the Wyoming Red Desert,

d = 2.98, which is the ratio of 7.698 acres per winter sheep AUM — from the 1975-1976 BLM weight estimate forage survey of the Seven Lakes Planning Unit to 2.587 acres/pronghorn month (from a Wyoming Game and Fish Department study conducted in the same area by Taylor [1975]), and

e = 1,339, the number of pronghorn in the ES area through the summer.

Therefore,

$$\frac{(5{,}000\text{x}6)(.098)}{2.98} + \frac{(1{,}339\text{x}6)(.098)}{2.98} = 1{,}251,$$

the minimum number of winter sheep AUMs that must be reserved for pronghorn.

b. *Mule Deer*

$$\frac{(a\text{x}b)(c)}{d} = \text{Winter sheep AUMs used by mule deer,}$$

where a = 175 mule deer year long in the ES area,

b = 12 months,

c = .14, the fractional diet similarity between yearlong deer and yearlong sheep, from BLM Manual Technical Supplement 66016, and

d = 4, the number of mule deer months equivalent to one AUM.

Therefore,

$$\frac{(175\text{x}12)(.14)}{4} = 74,$$

the minimum number of AUMs that must be reserved for mule deer.

5. Adding the forage reservations for both species of wildlife at least 1,325 winter sheep AUMs of forage must be reserved. MFP decisions and the AMPs reserve 3,434 winter sheep AUMs for wildlife.

B. Method of Computing Wild Horse Forage Reservation

1. MFP decision and the Seven Lakes Herd Management Area Plan (HMAP) call for a maximum of 135 wild horses in the ES area.

2. The fractional diet similarity between wild horses and sheep is .287, from Hansen (1975).

3. One horse month is equivalent to one AUM (BLM Instruction Memorandum No. 76-339).

4. Therefore, the minimum number of AUMs to be reserved for wild horses is

$$\frac{(135\text{x}12)(.287)}{1} = 465.$$

The proposed action reserves 517 winter sheep AUMs for wild horses.

C. Ratios Used to Convert AUMs Among Classes and Seasons of Livestock

1. Conversion ratios are based upon the ratios among livestock classes of AUMs available after completion of water developments. Computations are available for review at the Rawlins District Office.

a. *Ferris Allotment*

To convert summer cattle AUMs to winter sheep AUMs, multiply summer cattle AUMs by 2.07.

b. *Stewart Creek Allotment*

To convert summer cattle AUMs to winter sheep AUMs, multiply summer cattle AUMs by 1.71.

c. *Cyclone Rim Allotment*

To convert winter cattle AUMs to winter sheep AUMs, multiply winter cattle AUMs by 1.41.

To convert summer sheep AUMs to winter sheep AUMs, multiply summer sheep AUMs by 1.89.

Conversion factors used by allotment to convert summer cattle AUMs, summer sheep AUMs, or winter cattle AUMs to the common basis of winter sheep AUMs were derived from the suitability analysis originally prepared for each proposed AMP. These are available for public inspection and perusal in the Rawlins District BLM office.

In the Ferris allotment, summer cattle and winter sheep are proposed to graze. The allotment grazing capacity for winter sheep was determined to be 5,200 AUMs, with 2,517 AUMs for summer cattle. The ratio of 2,517 to 5,200 is 1:2.07. This ratio therefore becomes the conversion factor for summer cattle to winter sheep AUMs.

In the proposed Stewart Creek allotment the conversion factor was determined in the same manner. Twenty thousand, nine hundred and twenty-two point nine AUMs were found to be presently suitable on public land for winter sheep and 12,200.4 AUMs were found for summer cattle. Thus, the conversion factor for summer cattle to winter sheep was determined to be 1:1.71.

Conversion factors for the proposed Cyclone Rim allotment were based on proposed winter cattle, winter sheep, and summer sheep use. In the allotment, there were 33,820 presently suitable winter sheep AUMs on public land, 23,986 similar winter cattle AUMs, or 17,894 similar summer sheep AUMs. Thus, the conversion factor from winter cattle to winter sheep AUMs was 23,986 to 33,820 or 1:1.41. Conversion from summer sheep to winter sheep AUMs was 17,894 to 33,820 or 1:1.89. To convert from winter sheep to one of the other classes of livestock in an allotment, the inverse (1/x) of the conversion factor (x) should be used.

APPENDIX B-1-2

Legislative Provisions for Protection of Cultural Resources

A. The Antiquities Act of 1906 (34 Stat. 225; 16 USC 432, 433), is the basic legislation for the preservation and protection of antiquities on all public land. It provides penalties for those who excavate or appropriate the values without Secretarial permit; provides for the establishment by Presidential proclamation of national monuments from the public lands, and provides for permits for investigation of cultural and scientific resources to be issued to public scientific and educational institutions.

B. The National Historic Preservation Act of October 15, 1966 (80 Stat. 915; 16 USC 470), expands the national policy toward cultural resources to include those of state and local as well as national significance which should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people. Section 106 directs all federal agencies to take into account the affect of its actions on National Register properties.

C. The National Environmental Policy Act of 1969 (83 Stat. 852; 42 USC 4321) establishes national policy for protection and enhancement of the environment. Part of the function of the federal government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage."

D. The Reservoir Salvage Act of June 27, 1960 (74 Stat. 220, 221; 16 USC 469), as amended by the Historic and Archeological Data Preservation Act of 1974 (88 Stat. 1974; 166 USC 469), provides for the preservation of historical and archeological data which might otherwise be lost as the result of construction projects with federal funds.

E. Executive Order 11593 (Protection and Enhancement of the Cultural Environment) directs all federal agencies to inventory their cultural resources, to submit to the National Register of Historic Places all qualified sites meeting the criteria, and to protect all nominated sites. It also directs the federal agencies to use due caution on all cultural resources until inventory and evaluation takes place.

APPENDIX B-1-3

Grazing Use Assumptions

An assumption was made regarding the distribution of grazing use for the present situation, the proposed action, and the alternatives. The assumption is that actual grazing use by cattle has been 30% above the licensed cattle use in the existing Seven Lakes Grazing allotment because of unauthorized drift of cattle into it from the Green Mountain allotment. Authorized cattle use is 10,256 AUMs; therefore, the drift has amounted to 3,077 AUMs.

Within the boundaries of the new Seven Lakes Planning Unit, the same amount of unauthorized drift is assumed to continue (3,077 AUMs). Sixty percent of these AUMs (1,846) would be in the Arapahoe Creek allotment which is outside the ES area, leaving 1,231 AUMs in the ES area. Nine hundred and twenty three of these AUMs of use are assumed to be in the Cyclone Rim allotment and the remaining 308 are distributed in the Stewart Creek allotment.

Under Alternative 1, 90% of the 2,935 authorized cattle AUMs would be used in that portion of this alternative's proposed Seven Lakes allotment which would be the same area occupied by the Stewart Creek allotment in the proposed action. Ten percent of the AUMs (294) would be used in the area of the Cyclone Rim allotment of the proposed action. BLM initiated trespass actions, it is assumed, would end the drift by the short term. No drift would occur during the long term.

Because of winter snow conditions, all of the authorized sheep use (57,818 AUMs) is assumed to have been used up to the present time in the area of the proposed Seven Lakes allotment of Alternative 1. No unauthorized drift of winter sheep is assumed. Ninety percent of the 57,818 AUMs has been used in the proposed Cyclone Rim allotment area (52,036 AUMs), and 10% of the use (5,782 AUMs) has been made in the area of the proposed Stewart Creek allotment.

This assumption is based on the best estimates of grazing use by Divide Resource Area range conservationists.

APPENDIX B-1-4

Range Suitability Standards for Seven Lakes

Summer Cattle

1. Service area of water is greater than 4 miles ..... P.S.*
2. Service area of water is less than 4 miles
    3. Current *and/or* potential production of usable perennial forage is less than 25 pounds per acre (capacity is less than 32 acres/AUM) .... U.***
    3. Current *and/or* potential production of usable perennial forage is greater than 25 pounds per acre (capacity is greater than 32 acres/AUM) .... S.**
        4. SSF is 60 or greater .... U.
        4. SSF is less than 60
            5. SSF 40-60
                6. Slope greater than 20% .... U.
                6. Slope less than 20%.................. S.
            5. SSF less than 40 (see Table B-1)

Winter Sheep

1. Current *and/or* potential production of usable perennial forage is less than 25 pounds per acre (capacity is less than 32 acres/AUM)...................... U.
2. Current *and/or* potential production of usable perennial forage is greater than 25 pounds per acre (capacity is greater than 32 acres/AUM).................. S.
    3. SSF is 60 or greater .... U.
    3. SSF is less than 60
        4. SSF 40-60
            5. Slope greater than 20%................ U.
            5. Slope less than 20%...................... S.
        4. SSF less than 40 (see Table B-2)

Summer Sheep

1. Service area of water is greater than 8 miles ...... P.S.
2. Service area of water is less than 8 miles
    3. Current *and/or* potential production of usable perennial forage is less than 25 pounds per acre (capacity is less than 32 acres/AUM) .... U.
    3. Current *and/or* potential production of usable perennial forage is greater than 25 pounds per acre (capacity is greater than 32 acres/AUM) .... S.
        4. SSF is 60 or greater .... U.
        4. SSF is less than 60
            5. SSF 40-60
                6. Slope greater than 20%............... U.
                6. Slope less than 20%.................. S.
            5. SSF less than 40 (see Table B-2)

Winter Cattle

1. Service area of water is greater than 4 miles........ U.
2. Service area of water is less than 4 miles
    3. Current *and/or* potential production of usable perennial forage is less than 25 pounds per acre (capacity is less than 32 acres/AUM) .... U.
    3. Current *and/or* potential production of usable perennial forage is greater than 25 pounds per acre (capacity is greater than 32 acres/AUM)........... S.
        4. SSF is 60 or greater .... U.
        4. SSF is less than 60
            5. SSF 40-60
                6. Slope greater than 20% .... U.
                6. Slope less than 20%.................. S.
            5. SSF less than 40 (see Table B-1)

An example of how the range suitability standards for summer cattle were used is shown on Map B-1. Areas which are suitable or potentially suitable due to water, production, slope, and SSF are depicted on Map B-1. Locations of permanent and intermittent water sources are also shown on the map. For an area to be considered suitable for summer cattle grazing, there must be a permanent water source within 4 miles, the production must be at least 25 pounds per acre, and the slope and the SSF values must be met. All criteria must be met for the area before it would be considered suitable.

Areas depicted by orange on Map B-1 are suitable in terms of production but are not within 4 miles of a permanent water source; therefore, they are potentially suitable.

The blue areas depicted on the map are more than 4 miles from an intermittent or permanent water source and are considered potentially suitable.

Areas such as those discussed above were delineated for the entire Seven Lakes ES area for summer cattle, winter cattle, summer sheep, winter sheep, summer horses and winter horses.

An intermittent source of water is defined as one which has water available during the spring of the year or during periods of storm runoff. A permanent source of water provides water yearlong, and dry has no water, regardless of season.

*P.S. means Potentially Suitable
**S. means Suitable
***U. means Unsuitable

⚠1 CYCLONE RIM ALLOTMENT
255,517 Acres

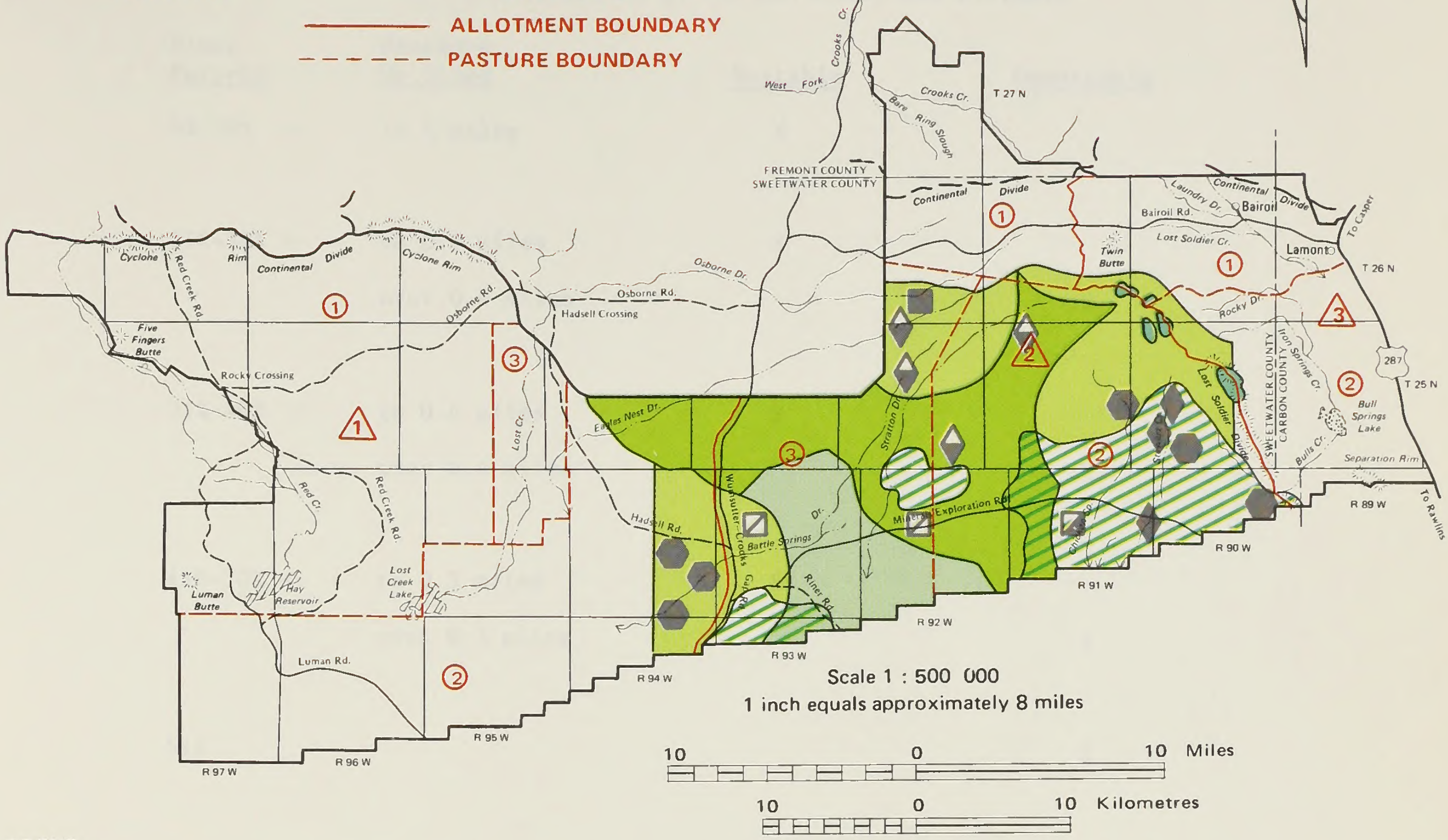
PASTURES
① CYCLONE
130,215 acres
② LUMAN
109,794 acres
③ LOST CREEK
15,508 acres

⚠2 STEWART CREEK ALLOTMENT
189,494 Acres

PASTURES
① SAND SPRING
40,124 acres
② CHICKEN SPRING
86,794 acres
③ OSBORNE WELL
62, 576 acres

⚠3 FERRIS ALLOTMENT
68,375 Acres

PASTURES
① LOST SOLDIER
29,530 acres
② BULL SPRINGS
38,845 acres



LEGEND

🟩 THOSE AREAS WHICH ARE WITHIN FOUR MILES OF AN INTERMITTENT WATER SUPPLY. THESE AREAS ARE POTENTIALLY SUITABLE.

▨ THOSE POTENTIALLY SUITABLE AREAS WHERE USEABLE FORAGE PRODUCTION IS LESS THAN 25 POUNDS PER ACRE.

🟩 THOSE AREAS WHICH ARE SUITABLE FOR GRAZING SUMMER CATTLE.

🟩 THOSE AREAS WHICH ARE POTENTIALLY SUITABLE BECAUSE THEY ARE MORE THAN FOUR MILES FROM WATER

🟩 POTENTIALLY SUITABLE AREAS WITH SLOPES GREATER THAN 20% AND SSF VALUES OVER 40.

■ PERMENANT WELL

◪ INTERMITTENT WELL

◆ PERMENANT RESERVOIR

⬢ PERMENANT SPRING

◇ INTERMITTENT RESERVOIR

▨ DRY WELL

RANGE SUITABILITY FOR SUMMER CATTLE

Seven Lakes Grazing

Environmental Statement

Map B - 1

TABLE B-1
RANGE SUITABILITY BY PERCENT SLOPE AND DISTANCE

Slope Percent	Distance Up Slope	Suitable	Unsuitable
0%-20% --	to 4 miles	X	
21%-30% --	to 0.6 miles	X	
	over 0.6 miles		X
31%-40% --	to 0.4 miles	X	
	over 0.4 miles		X
41%-50% --	to 0.3 miles	X	
	over 0.3 miles		X
51%			X

Source: BLM Information Memo DSC-76-54

TABLE B-2
RANGE SUITABILITY BY PERCENT SLOPE AND DISTANCE

Slope Percent	Distance Up Slope	Suitable	Unsuitable
0%-20% --	to 8 miles	X	
21%-30% --	to 1.2 miles	X	
	over 1.2 miles		X
31%-40% --	to 0.4 miles	X	
	over 0.4 miles		X
41%-50% --	to 0.3 miles	X	
	over 0.3 miles		X
51%			X

Source: BLM Information Memo DSC-76-54

APPENDIX B-2-1

SOILS CLASSIFICATION SYSTEM

Category	Number of Taxa	Nature of Differentiating Characteristics
Order	10	Soil-forming processes as indicated by presence or absence of major diagnostic horizons.
Suborder	47	Genetic homogeneity. Subdivision of orders according to presence or absence of properties associated with wetness, soil moisture regimes, major parent material, and vegetational effects as indicated by key properties; organic fiber decomposition stage in Histosols.
Great group	206 (approximate)	Subdivision of suborders according to similar kind, arrangement, and degree of expression of horizons, with emphasis regimes; presence or absence of diagnostic layers (plinthite, fragipan, duripan).
Subgroup		Central concept taxa for great group and properties indicating intergradations to other great groups, suborders, and orders; extragradation to "not soil".
Family		Properties important for plant root growth; broad soil textural classes averaged over control section or solum; mineralogical classes for dominant mineralogy of solum; soil temperature classes (based on mean annual soil temperature at 50 cm (20 in.) depth).
Series	10,000 (approximate) in United States	Kind and arrangement of horizons; color, texture, structure, consistence, and reaction of horizons; chemical and mineralogical properties of the horizons.

Source: Boul, S.W., Hole, F.D., and McCracken, R.J. 1973. Soil Genesis and Classification. Ames, Iowa: Iowa State University Press. pp. 199. Table 14.9.

APPENDIX B-2-2

Soil-Site Productivity Potentials

Soil-site productivity potentials were determined using data provided by the USDA, Soil Conservation Service (see Appendix B-2-3). The method we used employs SCS "range sites" to determine "stocking rates" in AUMs per acre by ecological climax condition. For calculation of site potential the "excellent" category was used. Range sites were determined for the Seven Lakes ES area (see Appendix B-2-3). The Initial Stocking Rates by Site (AUMs/acre) in an excellent range condition were determined for each range site (see description in Appendix B-2-3). Guides used are included in Tables B-5 and B-6 (Appendix B-2-3).

For example, the site potential for a loamy (LY) range site is .20 AUMs/acre or 5 acres/AUM.

In the soil map units where more than one range site occurred the following method was used to calculate soil-site productivity potentials. The percentage of each individual range site in a mapping unit was determined. The AUMs/acre were multiplied by the percentage of each range site in the soil map unit. The resulting values were added to give the soil-rate productivity potential for each map unit. For example, soil map unit 318 is composed of 95% shallow loamy (SWLY) and 5% loamy (LY) range sites. The calculations are shown in Table B-2A.

Acreages of each range site designation by allotment are presented in Table B-3, while the range site designations within each soil mapping unit are in Table B-4.

TABLE B-2A
CALCULATION OF SOIL-SITE PRODUCTIVITY POTENTIALS

Range Site	AUMs/acre	% Total		
SWLY	.12	.95	=	.114
LY	.20	.05		.010
		Mean AUMs/Acre		.136

$$\text{Acres/AUM} = \frac{1}{.124} = 8.07$$

TABLE B-3
ACREAGE OF EACH RANGE SITE BY ALLOTMENT

Allotment	7" to 9.99" Precipitation						10" to 14.99" Precipitation							
	Su [1]	VS	Ly	SwLy	Gr	Sa	CU	Ly	SwLy	Sy	Sa	Su	VS	TOTAL
Ferris	24,264	1,667	8,653	7,896	13,094	--	2,339	5,139	4,554	--	--	--	739	68,345
Stewart Creek	6,450	2,081	139,954	22,448	253	--	2,086	5,819	915	5,135	3,506	344	--	188,991
Cyclone Rim	135,465	818	65,287	50,697	--	3,250	--	--	--	--	--	--	--	255,517
Total	166,179	4,566	213,894	81,041	13,347	3,250	4,425	10,958	5,469	5,135	3,506	344	739	512,854

[1] See Tables B-5 and B-6 for explanation of abbreviations.

TABLE B-4
RANGE SITE DESIGNATIONS IN EACH SOIL MAPPING UNIT

Soil Mapping Number	Range Site	Percent	AUMs/ac	Weighted AUMs/ac	Ac/AUM
202	CU	80	.30 =	.240	
	Ly	20	.40 =	.080	
				.320	3.13
204	SwLy	55	.20 =	.110	
	Ly	45	.40 =	.180	
				.290	3.45
205	CU	95	.30 =	.285	
	Waste	5	-- =	--	
				.285	3.51
206	SwLy	50	.20 =	.100	
	VS	30	.12 =	.036	
	Waste	20	-- =	--	
				.136	7.35
207	Ly	85	.40 =	.340	
	SwLy	15	.20 =	.030	
				.370	2.70
208	Sy	80	.40 =	.320	
	Ly	10	.40 =	.040	
	Sa	10	.40 =	.040	
				.400	2.50
209	Sa	95	.40 =	.380	
	Sy	5	.40 =	.020	
				.400	2.50
214	SU	100	.25 =	.250	
				.250	4.00
301	SU	95	.20 =	.190	
	Waste	5	-- =	--	
				.190	5.26
302	VS	20	.10 =	.020	
	SwLy	30	.12 =	.036	
	SU	20	.20 =	.040	
	Ly	5	.20 =	.010	
	Waste	25	-- =	--	
				.106	9.43

TABLE B-4 (CONTINUED)
RANGE SITE DESIGNATIONS IN EACH SOIL MAPPING UNIT

Soil Mapping Number	Range Site	Percent	AUMs/ac		Weighted AUMs/ac	Ac/AUM
303	Ly	80	.20	=	.160	
	SwLy	10	.12	=	.012	
	SU	10	.20	=	.020	
					.192	5.21
304	SwLy	30	.12	=	.036	
	Ly	60	.20	=	.120	
	SU	10	.20	=	.020	
					.176	5.68
305	Ly	80	.20	=	.160	
	SU	10	.20	=	.020	
	SwLy	10	.12	=	.012	
					.192	5.21
306	SwLy	55	.12	=	.066	
	Ly	40	.20	=	.080	
	Waste	5	--		--	
					.146	6.85
307	Ly	95	.20	=	.190	
	SU	5	.20	=	.010	
					.200	5.00
308	Ly	55	.20	=	.110	
	SwLy	45	.12	=	.054	
					.164	**6.10**
310	SU	70	.20	=	.140	
	Ly	30	.20	=	.060	
					.200	5.00
311	SU	100	.20	=	.200	
					.200	5.00
312	SwLy	80	.12	=	.096	
	Waste	5	--	=	--	
	SwSy	15	.12	=	.018	
					.114	8.77
313	Gr	100	.10	=	.100	
					.100	10.00
314	Gr	85	.10	=	.085	
	Waste	15	--	=	--	
					.085	11.76

TABLE B-4 (CONTINUED)
RANGE SITE DESIGNATIONS IN EACH SOIL MAPPING UNIT

Soil Mapping Number	Range	Percent	AUMs/ac	Weighted AUMs/ac	Ac/AUM
316	SU	80	.20 =	.160	
	SwLy	20	.12 =	.024	
				.184	5.43
317	Waste	20	-- =	--	
	Gr	70	.10 =	.070	
	Ly	10	.20 =	.020	
				.090	11.11
318	SwLy	95	.12 =	.114	
	Ly	5	.20 =	.010	
				.124	8.06
319	Ly	80	.20 =	.160	
	SwLy	20	.12 =	.024	
				.184	5.43
320	SU	100	.20 =	.200	
				.200	5.00
321	SU	50	.20 =	.100	
	Sa	30	.15 =	.045	
	SwLy	15	.12 =	.018	
	Ly	5	.20 =	.010	5.78
				.173	5.78

APPENDIX B-2-3

Range Site Descriptions

Range site descriptions used in the ES area were provided by the USDA, Soil Conservation Service and developed from methodology explained in the SCS *National Range Handbook*. A range site is a distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. A range site is the product of all the environmental factors responsible for its development. It is capable of supporting a native plant community typified by an association of species that differs from that of other range sites in the kind or proportion of species or in "total production." In summary it is a basic soil vegetative unit.

The range site descriptions for both the 7"-9" and 10"-14" precipitation zones follow.

Table B-5 and Table B-6 show characteristics of range site descriptions.

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic Basins, Mountains & Plateaus

Location

Date March 1969

1. Range Site Name: Sands (Sa) 7"-9" P.Z.
Green River and Great Divide Basins

2. Climate: (See attached climatic description)

3. Topography and Elevation:

This site will usually occur in an upland position on rolling to very rough topography. The elevation ranges from 6,000 feet to 7,500 feet.

4. Soils:

a. The soils of this site are coarse textured loamy sand to sand soils usually occurring in an upland position and sometimes as dunes. The soils are light colored and 15 inches deep or deeper with rapid permeability.

b. The soils in this site may include one or more of the following taxonomic units:

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

The climax plant community is dominated by plants which prefer highly permeable soils and plants which can exist on unstable, shifting soils.

Decreasers (Relative Importance)

Bluebunch wheatgrass - 4
Bottlebrush - 3
Indian ricegrass - 3
Needle-and-thread - 2
Prairie junegrass - 5
Simple wildrye - 4
Thickspike wheatgrass - 2

Clovers - 5
Penstemons - 5

Bitterbrush - 5
Fourwing saltbush - 5
Winterfat - 5

Increasers (Max. % found in climax)

Galleta - 5
Needleleaf sedge - 5
Sandberg bluegrass - 5
Sand dropseed - 5
Threeawns - 3

Forbs: 10
Asters
Eriogonums
Fringed sagewort
Milkvetch
Paintbrushes
Phlox
Pointvetch
Sandwort
Sagebrush gilia
Scurfpea
Veiny dock

Woody Plants:
Big sagebrush - 5
Low rabbitbrush - 5
Rubber rabitbrush - 5
Shadscale - 10
Silver sagebrush - 10
Spiny hopsage - 10
Spiny horsebrush - 5

The increasers make up approximately 50% of the vegetation. As the condition deteriorates, the woody species become more dominant and annuals invade.

Approximate total annual yield of this site in excellent condition in an average year is 500 lbs. per acre air dry, but varies from 350 lbs. in less favorable years to 700 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic Basins, Mountains & Plateaus
Location
Date March 1969

1. Range Site Name: Loamy (Ly) 7"-9" P.Z.
Green River and Great Divide Basins

2. Climate: (See attached climatic description)

3. Topography and Elevation:

This site will usually occur in an upland position on relatively flat to moderately sloping land. The elevation ranges from 6,000 feet to 7,500 feet.

4. Soils:

a. The soils of this site are light colored and exceed 15 inches in depth. Textures range from very fine sandy loams through clay loams. Permeability is moderate to moderately slow.

b. The soils in this site may include one or more of the following taxonomic units:

RANGE SITE DESCRIPTION (Continued)
Loamy (Ly) 7"-9" P.Z.

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

The climax plant community is characterized by a variety of plants which prefer a medium textured soil with moderate permeability.

Decreasers (Relative Importance)

Bluebunch wheatgrass - 4
Bottlebrush squirreltail - 4
Canby bluegrass - 4
Indian rice grass - 4
Needle-and-thread - 3
Prairie junegrass - 4
Plains reedgrass - 5

Clovers - 5
Penstemons - 5

Winterfat - 4

Increasers (Max. % found in climax)

Needleleaf sedge - 3
Sandberg bluegrass - 5
Thickspike wheatgrass - 30

Forbs: 5
Asters
Bicuit root
Death camas
Eriogonum
Fleabane
Hawksbeard
Phlox
Pussytoes
Sagebrush gilia
Scarlet globemallow
Toadflax
Western yarrow

Woody Plants:
Big sagebrush - 20
Low rabbitbrush - 10
Shadscale - 3
Spineless horsebrush - 3

The increasers make up approximately 55% of the vegetation. As the condition deteriorates, Big sagebrush becomes more dominant.

Approximate total annual yield of this site in excellent condition in an average year is 500 lbs. per acre air dry, but varies from 300 lbs. in less favorable years to 700 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION	WYOMING
Land Resource Area	(34) Central Desertic Basins, Mountains & Plateaus
Location	
Date	March 1969

1. Range Site Name: Shallow Loamy (SwLy) 7"-9" P.Z.
Green River and Great Divide Basins

2. Climate: (See attached climatic description)

3. Topography and Elevation:

This site will usually occur in an upland position, on south and west facing slopes, but can be found on all slopes and positions. The elevation ranges from 6,000 feet to 7,500 feet.

4. Soils:

a. The soils of this site range in texture from very fine sandy loams to clay loams. Soil depth is 8 inches to 15 inches over all kinds of bedrock except igneous or volcanic. Bedrock is commonly limestones. siltstones or shales. This soil may also include some deep usually gravelly or cobbly, soils on south and west facing slopes which react like shollow soils. Permeability is moderate to moderately slow.

b. The soils in this site may include one or more of the following taxonomic units:

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

The climax plant community is dominated by plants which can grow with restricted root depth and under drouthy conditions.

Decreasers (Relative Importance)

Bluebunch wheatgrass - 2
Bottlebrush squirreltail - 4
Indian ricegrass - 3
Letterman needlegrass - 5
Needle-and-thread - 3
Prairie junegrass - 4
Thickspike wheatgrass - 3

Clovers - 5
Penstemon - 5

Winterfat - 4

Increasers (Max. % found in climax)

Needleleaf sedge - 5
Sandberg bluegrass - 5

Forbs: 10
Aster
Biscuit root
Common commandra
Eriogonums
Fleabane
Goldenweed
Milkvetch
Phlox
Pointvetch
Pussytoes
Sagebrush gilia
Scarlet globemallow
Stonecrop
Western yarrow

Woody Plants:
Big sagebrush - 5
Low rabbitbrush - 5
Low sagebrush - 5

The increasers make up approximately 40% of the vegetation. As the condition deteriorates, increasing forbs become more dominant.

Approximate total annual yield of this site in excellent condition in an average year is 350 lbs. per acre air dry, but varies from 200 lbs. in less favorable years to 450 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area	(34) Central Desertic Basins, Mountains & Plateaus
Location	
Date	March 1969

1. Range Site Name: Saline Upland (SU) 7"-9" P.Z.
   Green River and Great Divide Basins

2. Climate: (See attached climatic description)

3. Topography and Elevation:

   This site will usually occur in a lowland position, but can occur in all positions and on all slopes. The elevation ranges from 6,000 feet to 7,500 feet.

4. Soils:

   a. The soils of this site are light colored and usually exceed 15 inches in depth. The topsoil has a high salt content and/or exchangeable sodium content. Permeability is moderate to slow.

   b. The soils in this site may include one or more of the following taxonomic units:

RANGE SITE DESCRIPTION (Continued)
Saline Upland (SU) 7"-9" P.Z.

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

The climax plant community is characterized by plants which are highly salt tolerant and can withstand drouthy conditions.

Decreasers (Relative Importance)

Basin wildrye - 5
Bottlebrush squirreltail - 2
Indian ricegrass - 3
Western wheatgrass - 4

Bud sagebrush - 3
Gardners saltbush - 2

Increasers (Max. % found in climax)

Sandberg bluegrass - 3

Forbs: 5
Aster
Death camas
Eriogonum
Milkvetch
Princesplume
Phlox
Pointvetch
Primrose
Pussytoes
Woody aster

Woody Plants:
Birdfoot sagebrush - 5
Greasewood - 5
Winterfat - 15

The increasers make up approximately 20% of the vegetation. As the condition deteriorates, the grasses and Gardners saltbush decrease and annuals invade.

Approximate total annual yield of this site in excellent condition in an average year is 450 lbs. per acre air dry, but varies from 300 lbs. in less favorable years to 600 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic
Basins, Mountains &
Plateaus

Location
Date March 1969

1. Range Site Name: Gravelly (Gr) 7"-9" P.Z.
Green River and Great Divide Basins

2. Climate: (See attached climatic description)

3. Topography and Elevation:

This site will normally occur in terrace breaks or along perennial or intermittent streams. The elevation ranges from 6,000 feet to 7,500 feet.

4. Soils:

a. The soils of this site are very gravelly, usually of sandy or loamy textures. The coarse fragments are up to 3 inches in diameter, cover 50% to 75% of the surface and usually make up 40% of 50% by volume of the first 20 inches of soil. These soils are relatively unstable and permeability is rapid to very rapid.

b. The soils in this site may include one or more of the following taxonomic units:

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

The climax plant community is dominated by shallow rooted plants and plants which can exist on an unstable drouthy soil.

Decreasers (Relative Importance)

Bluebunch wheatgrass - 2
Bottlebrush squirreltail - 4
Indian ricegrass - 3
Needle-and-thread - 3
Prairie junegrass - 4
Thickspike wheatgrass - 4

Penstemon - 5
Violet - 5

Winterfat - 4

Increasers (Max. % found in climax)

Needleleaf sedge - 5
Sandberg bluegrass - 10
Threeawn - 3

Forbs: 10
Aster
Fleabane
Fringed sagewort
Golden pea
Goldenweed
Milkvetch
Nailwort
Paintbrush
Pointvetch
Primrose
Pussytoes
Sagebrush gilia
Sandwort
Stonecrop
Western yarrow

Woody Plants:
Low rabbitbrush - 5
Skunkbush - 5

The increasers make up approximately 35% of the vegetation. As the condition deteriorates, the increasing forbs become more dominant.

Approximate total annual yield of this site in excellent condition in an average year is 350 lbs. per acre air dry, but varies from 200 lbs. in less favorable years to 450 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic Basins, Mountains & Plateaus

Location
Date March 1969

1. Range Site Name: Very Shallow (VS) 7"-9" P.Z.
Green River and Great Divide Basins

2. Climate: (See attached climatic description)

3. Topography and Elevation:

This site will usually occur in upland position on sttep slopes, but may occur in all positions and on all slopes. The elevation ranges from 6,000 feet and 7,500 feet.

4. Soils:

a. The soils of this site are generally less than 8 inches deep, but this site will include areas of exposed bedrock and pockets of deep soil. Bedrock includes all kinds except igneous and soft clay shales. Permeability is variable, depending on texture and runoff is high.

b. The soils in this site may include one or more of the following taxonomic units:

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

The climax plant community is dominated by plants which can survive with extreme limitations on soil depth and under drouthy conditions.

Decreasers (Relative Importance)

Bluebunch wheatgrass - 2
Bottlebrush squirreltail - 4
Indian ricegrass - 4
Needle-and-thread - 4
Prairie junegrass - 5
Thickspike wheatgrass - 3

Clovers - 5
Penstemon - 5

Winterfat - 5

Increasers (Max. % found in climax)

Needleleaf sedge - 10
Sandberg bluegrass - 10
Threeawn - 3

Forbs: 10
Aster
Biscuit root
Eriogonums
Fleabane
Goldenweed
Milkvetch
Paintbrush
Phlox
Pointvetch
Pussytoes
Sagebrush gilia
Sageworts
Scarlet globemallow
Stonecrop
Toadflax
Western yarrow

Woody Plants:
Big sagebrush - 5
Juniper - 10
Low rabbitbrush - 5
Skunkbush - 5

The increasers make up approximately 40% of the vegetation. As the condition deteriorates, increasing forbs and Sandberg bluegrass become more dominant.

Approximate total annual yield of this site in excellent condition in an average year is 300 lbs. per acre air dry, but varies from 200 lbs. in less favorable years to 400 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic
Basins, Mountains &
Plateaus

Location ____________________
Date ____________________

1. Range Site Name: Very Shallow (VS) 10"-14" P.Z.
High Plains Southeast

2. Climate: (See attached climatic description)

3. Topography and Elevation:

This site will usually occur in an upland position on steep slopes. The elevation of the area is about 6,500 feet to 7,500 feet.

4. Soils:

a. These are very shallow, well drained loamy soils with many outcrops of sedimentary bedrock with pockets of deep soil interspersed throughout the area.

b. The soils in this site may include one or more of the following taxonomic units:

RANGE SITE DESCRIPTION (Continued)
Very Shallow (VS) 10"-14" P.Z.

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

Decreasers (Relative Importance)

Bluebunch wheatgrass - 2
Canby bluegrass - 5
Indian ricegrass - 5
Needle-and-thread - 5
Squirreltail - 4
Western wheatgrass - 4

Forbs: 4
Penstemon

Woody Plants:
Mountain mahogany - 3
Antelope bitterbrush - 4

Increasers (Max. % Found in Climax)

Prairie junegrass - 5
Sandberg bluegrass - 10
Threadleaf sedge - 5

Forbs: 10
Eriogonums
Fringed sagewort
Hoods phlox

Woody Plants:
Big sagebrush - 5
Black sagebrush - 5
Juniper - 5

The increasers make up approximately 45% of the vegetation. As the condition deteriorates, juniper may tend to dominate the site.

Approximate total yield of this site in excellent condition in average years is 450 lbs. per acre air dry, but varies from a low of about 250 lbs. in less favorable years to a high of about 600 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic Basins, Mountains & Plateaus

Location ______________________

Date ______________________

1. Range Site Name: Saline Upland (SU) 10"-14" P.Z.
   High Plains Southeast

2. Climate: (See attached climatic description)

3. Topography and Elevation:

   This site will usually occur in an upland position and can occur on all slopes. The elevation of the area is about 6,500 feet to 7,500 feet.

4. Soils:

   a. These are saline and/or alkaline soils in the uplands. Slick spots are common throughout the area.

   b. The soils in this site may include one or more of the following taxonomic units:

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

The climax plant community is dominated by plants that can withstand salt content of the soil but will have a high percentage of grasses as well.

Decreasers (Relative Importance)

Alkali sacaton - 5
Bloomer's ricegrass - 3
Indian ricegrass - 3
Squirreltail - 3
Western wheatgrass - 2

Forbs: 4

Gardners saltbush - 2

Winterfat - 5

Increasers (Max. % Found in Climax)

Threadleaf sedge - 5
Sandberg bluegrass - 5
Inland saltgrass - 10

Forbs: 5
Woody aster
Hoods phlox
Princesplume

Woody Plants:
Birdsfoot sagebrush - 10
Greasewood - 5

The increasers make up approximately 15% of the vegetation. As the site deteriorates, grasses become less prevalent on the site.

Approximate total annual yield of this site in excellent condition in an average year is 500 lbs. per acre air dry, but varies from a low of about 300 lbs. in less favorable years to a high of about 650 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic Basins, Mountains & Plateaus

Location ____________________

Date ____________________

1. Range Site Name: Shallow Loamy (SwLy) 10"-14" P.Z.
   High Plains Southeast

2. Climate: (See attached climatic description)

3. Topography and Elevation:

   This site is usually in an upland position, but will also occur on all slopes and positions. The elevation of the area is about 6,500 feet to 7,500 feet.

4. Soils:

   a. These soils are shallow, well drained very fine sandy loams, loams, and silt loams underlain by sedimentary bedrocks.

   b. The soils in this site may include one or more of the following taxonomic units:

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

Decreasers (Relative Importance)

Bluebunch wheatgrass - 3
Canby bluegrass - 5
Green needlegrass - 5
Indian ricegrass - 5
Mountain muhly - 5
Mutton bluegrass - 4
Plains reedgrass - 5
Needle-and-thread - 4
Western wheatgrass - 4
Squirreltail - 4

Forbs: 4

Woody Plants
Bitterbrush - 5
Mt. Mahogany - 4
Winterfat - 5

Increasers (Max. % Found in Climax)

Blue grama - 5
Prairie junegrass - 5
Sandberg bluegrass - 5
Threadleaf sedge - 5

Forbs: 10
Hoods phlox
Fringed sagewort
Western yarrow
Paintbrush
Larkspur

Woody Plants:
Big sagebrush - 5
Black sagebrush - 15
Low rabbitbrush - 5
Skunkbrush - 5

The increasers make approximately 35% of the vegetation. As the condition deteriorates, shorter grasses and grass like species will dominate the site.

Approximate total annual yield of this site in excellent condition in an average year is 900 lbs. per acre air dry, but varies from a low of about 700 lbs. in less favorable years to a high of about 1,200 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic Basins, Mountains & Plateaus

Location ____________________
Date ____________________

1. Range Site Name: Coarse Upland (CU) 10"-14" P.Z.
High Plains Southeast

2. Climate: (See attached climatic description)

3. Topography and Elevation:

This site will usually occur in an upland position, terraces or glacial moraines and may occur on all slopes. The elevation of the area is about 6,500 feet to 7,500 feet.

4. Soils:

a. These soils are deep and moderately deep, well drained very fine sandy loams, loams, silt loams, and clay loams with 35 percent or more coarse fragments (gravel, cobble, stone) and flagstone.

b. The soils in this site may include one or more of the following taxonomic units:

RANGE SITE DESCRIPTION (Continued)
Coarse Upland (CU) 10"-14" P.Z.

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

Decreasers (Relative Importance)

Bluebunch wheatgrass - 3
Canby bluegrass - 5
Green needlegrass - 5
Indian ricegrass - 5
Mountain muhly - 5
Mutton bluegrass - 4
Little bluestream - 3

Forbs: 4
Winterfat

Woody Plants:
Bitterbrush - 4
Serviceberry - 4

Increasers (Max. % Found in Climax)

Blue grama - 5
Prairie junegrass - 5
Sandberg bluegrass - 5
Threadleaf sedge - 5
Western wheatgrass - 10

Forbs: 10
Hoods phlox
Fringed sagewort
Western yarrow
Paintbrush
Larkspur

Woody Plants:
Big sagebrush - 5
Black sagebrush - 15
Low rabbitbrush - 5

The increasers make up approximately 35% of the vegetation. As the condition deteriorates, Western wheatgrass will tend to dominate the site.

Approximate total annual yield of this site in excellent condition in an average year is 1,000 lbs. per acre air dry, but varies from a low of about 600 lbs. in less favorable years to a high of about 1,400 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic Basins, Mountains & Plateaus

Location ____________________

Date ____________________

1. Range Site Name: Loamy (Ly) 10"-14" P.Z.
   High Plains Southeast

2. Climate: (See attached climatic description)

3. Topography and Elevation:

   This site will usually occur in an upland position on relatively flat to moderately sloping land. The elevation of the area is about 6,500 feet to 7,500 feet.

4. Soils:

   a. These soils are deep and moderately deep, well drained with very fine sandy loam, loam silt loam surface layers. Soils with fine sandy loam surface layers less than 6" thick and loam or clay loam subsoils are included.

   b. The soils in this site may include one or more of the following taxonomic units:

RANGE SITE DESCRIPTION (Continued)
Loamy (Ly) 10"-14" P.Z.

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

Decreasers (Relative Importance)

Bloomers ricegrass - 4
Bluebunch wheatgrass - 3
Canby bluegrass - 5
Green needlegrass - 4
Indian ricegrass - 4
Mountain muhly - 5
Mutton bluegrass - 3
Needle-and-thread - 3
Squirreltail - 4
Western wheatgrass - 2

Forbs: 4
Penstemon

Increasers (Max. % Found in Climax)

Blue grama - 5
Plains reedgrass - 5
Prairie junegrass - 5
Sandberg bluegrass - 5
Threadleaf sedge - 5
Needleleaf sedge - 5

Forbs: 10
Western yarrow
Scarlet globemallow
Hoods phlox
Larkspur Sp.
Fringed sagewort

Woody Plants:
Big sagebrush - 15
Low rabbitbrush - 5

The increasers make up approximately 40% of the vegetation. As the condition deteriorates, Big sagebrush and rabbitbrush will dominate the site.

Approximate total annual yield of this site in excellent condition in an average year is 1,100 lbs. per acre air dry, but varies from a low of about 600 lbs. in less favorable years to a high of about 1,400 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic Basins, Mountains & Plateaus

Location ____________________

Date ____________________

1. Range Site Name: Sandy (Sy) 10"-14" P.Z.
High Plains Southeast

2. Climate: (See attached climatic description)

3. Topography and Elevation:

This site will usually occur in an upland position on relatively flat to moderately sloping land. The elevation of the area is about 6,500 feet to 7,500 feet.

4. Soils:

a. These soils are deep and moderately deep, well drained loamy sands, sandy loams, and fine sandy loams. Soil with fine sandy loam surfaces (less than 6" thick) with loam or clay loam subsoils are excluded.

b. The soils in this site may include one or more of the following taxonomic units:

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

Decreasers (Relative Importance)

Plains reedgrass - 5
Bloomers ricegrass - 4
Bluebunch wheatgrass - 4
Canby bluegrass - 5
Indian ricegrass - 3
Mountain muhly - 5
Mutton bluegrass - 3
Needle-and-thread - 2
Squirreltail - 4

Forbs: 4
Penstemon

Bitterbrush - 5
Winterfat - 5

Increasers (Max. % Found in Climax)

Blue grama - 5
Prairie junegrass - 5
Sandberg bluegrass - 5
Threadleaf sedge - 10
Thickspike wheatgrass - 30
Sand dropseed - 5

Forbs: 5
Asters
Scarlet globemallow
Hoods phlox
Skeleton weed
Fringed sagewort
Eriogonum
Death camas
Sagebrush gilia
Toadflax

Woody Plants:
Big sagebrush - 10
Low rabbitbrush - 10
Silver sagebrush - 10
Shadscale - 5
Spineless horsebrush - 5

The increasers make up approximately 50% of the vegetation. As the condition deteriorates, Big sagebrush and rabbitbrush will dominate the site.

Approximate total annual yield of this site in excellent condition in an average year is 1,200 lbs. per acre air dry, but varies from a low of about 700 lbs. in less favorable years to a high of about 1,500 lbs. in more favorable years.

6. Specific Site Location:

RANGE SITE DESCRIPTION WYOMING

Land Resource Area (34) Central Desertic Basins, Mountains & Plateaus

Location ____________________

Date ____________________

1. Range Site Name: Sands (Sa) 10"-14" P.Z.
   High Plains Southeast

2. Climate: (See attached climatic description)

3. Topography and Elevation:

   This site will usually occur in an upland position on rolling to rough topography. The elevation of the area is about 6,500 feet to 7,500 feet.

4. Soils:

   a. These soils are deep and moderately deep, excessively drained sands on nearly level to rolling uplands.

   b. The soils in this site may include one or more of the following taxonomic units:

c. Complete soil series descriptions are available in the soil survey descriptive legend.

5. Climax Vegetation:

Decreasers (Relative Importance)

Blowout grass - 4
Bloomers ricegrass - 4
Bluebunch wheatgrass - 4
Simple wildrye
Canby bluegrass - 5
Indian ricegrass - 3
Mutton bluegrass - 5
Needle-and-thread - 2
Squirreltail - 3
Thickspike wheatgrass - 2

Forbs: 4
Clovers
Penstemons

Bitterbrush - 5

Increasers (Max. % Found in Climax)

Prairie junegrass - 5
Sandberg bluegrass - 5
Needleleaf sedge - 5

Forbs: 10
Lemon scurfpea
Eriogonum
Paintbrush
Phlox
Veiny dock

Woody Plants:
Big sagebrush - 5
Fringed sagewort - 5
Low rabbitbrush - 5
Shadscale - 5
Spiny horsebrush - 5
Spineless horsebrush - 5

The increasers make up approximately 40% of the vegetation. As the condition deteriorates, blow out areas may become evident.

Approximate total annual yield of this site in excellent condition in an average year is 1,400 lbs. per acre air dry, but varies from a low of about 900 lbs. in less favorable years to a high of about 1,700 lbs. in more favorable years.

6. Specific Site Location:

WYOMING
HIGH PLAINS
SOUTHERN WYOMING
10" - 14" P.Z.

TABLE B-5
TECHNICIAN GUIDE TO RANGE SITES AND RANGE CONDITION WITH INITIAL STOCKING RATE
Key Climax Plants and Others That Invade

KEY CLIMAX PLANTS		Maximum Percentages in Climax by Range Site										
DECREASERS	INCREASERS	WL	Sb	SS	LL	SL	OV	CyO	Sa	Sy	Ly	Cy
Alkali sacaton	Blue grama				5					5	5	5
Basin wildrye	Kentucky bluegrass		10				5	5				
Bluebunch wheatgrass	Inland saltgrass			10		15						
Canby bluegrass	Low growing sedges	10	10	10	10	5	5	5	5	10	10	5
Green needlegrass	Mat muhly		5	10		5						
Indian ricegrass	Plains reed grass									5	5	10
Mutton bluegrass	Prairie junegrass				5		5	5	5	5	5	5
Tall sedges	Sandberg bluegrass				5	5	5	5	5	5	5	5
Needle and thread	Rhizomatous wheatgrass		15	d	25	d	40	50	d	30	d	d
Reed grasses	*Perennial forbs	10	10	5	5	5		5	10	5	10	10
Nuttall alkaligrass	Big sagebrush				5		5	5	5	10	15	5
Spiked fescue	Black sagebrush											
Squirreltail	Birdsfoot sagebrush					5		5				10
Slender wheatgrass	Cottonwood				10							
Mannagrass	Greasewood			5		20						
Tufted hairgrass	Juniper											
Perennial forbs	Rabbit brush		5	5	10	5	5	5	5	10	5	5
Bitterbrush	Shrubby cinquefoil		5									
Gardner's saltbrush	Silver sagebrush				10		10	10		10		
Mt. Mahogany	Fringed sagewort								5			
Winterfat												
Service berry	Other woody	5	5		5				15	10		
	Willows	15	5									
Total % Increasers allowed toward condition class		40	40	40	50	45	55	55	40	50	40	35

Range Condition	% Original Vegetation	Initial Stocking Rate by Site (AUMs/Acre)										
		WL	Sb	SS	LL	SL	OV	CyO	Sa	Sy	Ly	Cy
Excellent	76 - 100	3.0	2.0	1.5	0.6	0.5	0.6	0.6	0.4	0.4	0.4	0.4
Good	51 - 75	2.5	1.5	1.2	0.5	0.4	0.5	0.5	0.3	0.33	0.33	0.33
Fair	26 - 50	1.5	1.0	0.8	0.25	0.15	0.25	0.25	0.2	0.2	0.2	0.2
Poor	0 - 25	1.0	0.6	0.4	0.15	0.10	0.15	0.15	0.1	0.1	0.1	0.10

WYOMING
HIGH PLAINS
SOUTHERN WYOMING
10" - 14" P.Z.

TABLE B-5 (CONTINUED)
TECHNICIAN GUIDE TO RANGE SITES AND RANGE CONDITION WITH INITIAL STOCKING RATE
Key Climax Plants and Others That Invade

KEY CLIMAX PLANTS		Maximum Percentages in Climax by Range Site										
DECREASERS	INCREASERS	SLy	CU	SwSy	SwLy	SwCy	SwB	SU	IC	Gr	VS	Sh
Alkali sacaton	Blue grama	5	5	5	5							
Basin wildrye	Kentucky bluegrass											
Bluebunch wheatgrass	Inland saltgrass											
Canby bluegrass	Low growing	10	5	10	5	5	5	5		10	5	5
Green needlegrass	Mat muhly											
Indian ricegrass	Plains reed	5										
Mutton bluegrass	Prairie junegrass	5	5	5	5	5	5			5	5	
Tall sedges	Sandberg bluegrass	5	5	5	5	5	5	5	5	10	10	5
Needle and thread	Rhizomatous wheatgrass	d	10	d	d	d	d	d	d	d	d	d
Reed grasses	*Perennial forbs	10	10	10	10	5	10	5	5	5	10	5
Nuttall alkaligrass	Big sagebrush	15	5		5	5	5				5	
Spiked fescue	Black sagebrush	10	15	15	15		15				5	
Squirreltail	Birdsfoot sagebrush							10	30			15
Slender wheatgrass	Cottonwood											
Mannagrass	Greasewood							5				
Tufted hairgrass	Juniper						50				5	
Perennial forbs	Rabbit brush	5	5	5	5		5		5	5		
Bitterbrush	Shrubby cinquefoil											
Gardner's saltbrush	Silver sagebrush											
Mt. Mahogany	Fringed sagewort											
Winterfat												
Service berry	Other woody			5	5					5		
	Willows											
Total % Increasers allowed toward condition class		50	35	35	35	30	65	15	35	35	45	20
Range Condition	% Original Vegetation	Initial Stocking Rate by Site (AUMs/Acre)										
Excellent	76 - 100	0.3	0.3	0.2	0.2	0.2	0.15	0.25	0.2	0.15	0.12	0.10
Good	51 - 75	0.25	0.25	0.17	0.17	0.17	0.12	0.20	0.17	0.12	0.09	0.07
Fair	26 - 50	0.15	0.15	0.1	0.10	0.10	0.05	0.12	0.10	0.05	0.04	0.04
Poor	0 - 25	0.07	0.07	0.05	0.05	0.05	0.03	0.06	0.05	0.03	0.02	0.02

WYOMING
HIGH PLAINS
SOUTHERN WYOMING
10" - 14" P.Z.

TABLE B-5 (CONTINUED)
TECHNICIAN GUIDE TO RANGE SITES AND RANGE CONDITION WITH INITIAL STOCKING RATE
Key Climax Plants and Others That Invade

Legend: *Count no more than 5% of any one species unless listed separately
Blanks - not important
d - decreaser; all allowed
5, 10, etc. - increaser; percent found in climax

Invaders:
All annuals
All exotics
Broom snakeweed
Curly cup gumweed
Foxtail barley
Thistles
Tumblegrass
Cactus

WL - Wetland
Sb - Subirrigated
SS - Saline subirrigated
LL - Lowland
SL - Saline Lowland
OV - Overflow
CyO - Clayey Overflow
Sa - Sands
Sy - Sandy
Ly - Loamy
Cy - Clayey

SLy - Steep Loamy
CU - Coarse Upland
SwSy - Shallow Sandy
SwLy - Shallow Loamy
SwCy - Shallow Clayey
SwB - Shallow breaks
SU - Saline Upland
IC - Impervious clay
Gr - Gravelly
VS - Very Shallow
Sh - Shale

Source: . Soil Conservation Service

WYOMING
GREEN RIVER AND
GREAT DIVIDE BASIN
7" - 9" P.Z.

TABLE B-6
TECHNICIAN GUIDE TO RANGE SITES AND RANGE CONDITION WITH INITIAL STOCKING RATE
Key Climax Plants and Others That Invade

KEY CLIMAX PLANTS		Maximum Percentages in Climax by Range Site									
DECREASERS	INCREASERS	WL	Sb	SS	LL	SL	Sa	Sy	Ly	Cy	DC
Alkali sacaton	Galleta grass						5	5			
Basin wildrye	Inland saltgrass			5		10					
Bluebunch wheatgrass	Low sedges and rushes	15	10	10	5	5	5	5	5	5	
Indian ricegrass	Mat muhly		5	5		5					
Letterman needlegrass	Rhizomatous wheatgrass		10	5	20	d	d	25	30	d	d
Mannagrasses	Sandberg bluegrass				5	5	5	5	5	5	5
Needleandthread	*Perennial forbs	10	10	5	10	5	10	5	5	5	5
Nuttall alkaligrass	Big sagebrush				5		5	15	20	15	
Prairie junegrass	Birdsfoot sagebrush									5	5
Reedgrasses	Buffaloberry		5		10						
Simple wildrye	Cottonwood		5		20						
Slender wheatgrass	Greasewood			5		25					
Squirreltail	Greenmolly summercypress										
Tall sedges	Horsebrushes						5	5	5		5
Tufted hairgrass	Juniper								Inv.		
Perennial forbs	Low sagebrush									5	20
Bitterbrush	**Rabbitbrushes		5	5	5	5	10	15	10	5	5
Bud sagebrush	Roses	5	5		5						
Fourwing saltbush	Shadscale						10	5			
Gardners saltbush	Shrubby cinquefoil		5								
	Silver sagebrush				5		10				
	Skunkbush				5	5					
	Spiny hopsage						10	5			
	Willows	10	10		5						
	Winterfat					d	d	d	d	d	d
Total % Increasers allowed toward condition class		40	40	40	50	45	50	45	55	40	35

Range Condition	% Original Vegetation	Initial Stocking Rates by Site (AUMs/ACRE)									
Excellent	76 - 100	2.60	1.80	1.20	0.40	0.30	0.15	0.20	0.20	0.20	0.15
Good	51 - 75	2.00	1.40	1.00	0.33	0.22	0.12	0.17	0.17	0.17	0.12
Fair	26 - 50	1.20	1.00	0.60	0.17	0.12	0.07	0.10	0.10	0.10	0.07
Poor	0 - 25	0.80	0.60	0.20	0.10	0.07	0.04	0.05	0.05	0.05	0.03

WYOMING
GREEN RIVER AND
GREAT DIVIDE BASIN
7" - 9" P.Z.

TABLE B-6 (CONTINUED)
TECHNICIAN GUIDE TO RANGE SITES AND RANGE CONDITION WITH INITIAL STOCKING RATE
Key Climax Plants and Others That Invade

KEY CLIMAX PLANTS		Maximum Percentages in Climax by Range Site								
DECREASERS	INCREASERS	SwSy	SwLY	SwCy	SwB	IC	Su	Gr	VS	Sh
Alkali sacaton	Galleta grass	40								
Basin wildrye	Inland saltgrass									
Bluebunch wheatgrass	Low sedges and rushes	5	5	5	5			5	10	
Indian ricegrass	Mat muhly									
Letterman needlegrass	Rhizomatous wheatgrass	d	d	d	d	d	d	d	d	d
Mannagrasses	Sandberg bluegrass	5	5	5	5	5		10	10	
Needleandthread	*Perennial forbs	5	5	10	10	5	5	10	10	5
Nuttall alkaligrass	Big sagebrush	5	5	5	10				5	
Prairie junegrass	Birdsfoot sagebrush			10		40	5			10
Reedgrasses	Buffaloberry									
Simple wildrye	Cottonwood									
Slender wheatgrass	Greasewood						5			
Squirreltail	Greenmolly summercypress									10
Tall sedges	Horsebrushes			5						5
Tufted hairgrass	Juniper	Inv.	Inv.		50				10	
Perennial forbs	Low sagebrush		5	10						
Bitterbrush	**Rabbitbrushes	10	5	5				5	5	
Bud sagebrush	Roses									
Fourwing saltbush	Shadscale									
Gardners saltbush	Shrubby cinquefoil									
	Silver sagebrush									
	Skunkbush							5	5	
	Spiny hopsage									
	Willows									
	Winterfat	d	d	15	d	d	15	d	d	d
Total % Increasers allowed toward condition class		50	40	40	65	40	20	35	40	20

Range Condition	% Original Vegetation	Initial Stocking Rates by Site (AUMs/ACRE)								
Excellent	76 - 100	0.12	0.12	0.12	0.10	0.10	0.20	0.10	0.10	0.07
Good	51 - 75	0.09	0.09	0.09	0.08	0.08	0.17	0.08	0.08	0.05
Fair	26 - 50	0.04	0.04	0.04	0.04	0.04	0.10	0.04	0.94	0.02
Poor	0 - 25	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.02	0.01

TABLE B-6 (CONTINUED)
TECHNICIAN GUIDE TO RANGE SITES AND RANGE CONDITION WITH INITIAL STOCKING RATE
Key Climax Plants and Others That Invade

Legend:
*Count no more than 5% of any one species unless listed separately
**Low rabbitbrush decreases with winter sheep use
blank - not important
5, 10, etc. - Increaser; percent found in climax
Inv. - Invader on the site
Decreaser Column - These plants are decreasers on all istes on which they are found.

Invaders
All annuals
All exotics
Broom snakeweed
Docks
Curlycup gumweed
Cactus
Foxtail barley
Thistles

WL - Wetland
LY - Loamy
SwB - Shallow Breaks
Sb - Subirrigated
Cy - Clayey
IC - Impervious Clay

SS - Saline subirrigated
DC - Dense Clay
SU - Saline Upland
SL - Saline Lowland
LL - Lowland
SwSy - Shallow Sandy
Gr - Gravelly

Sa - Sands
SwLy - Shallow Loamy
VS - Very Shallow
Sy - Sandy
SwCy - Shallow Clayey
Sh - Shale

Source: Soil Conservation Service

APPENDIX B-2-4

SOIL AND WIND ERODABILITY

Relationship of Dry Soil Aggregates to Soil Erodability Index and Wind Erodability Group

Wind Erodability Group (WEG)	Dry Soil Aggregates 0.84 mm (percent)	Soil Erodability Index(I) (tons/acre/year)
1	0.5-1.5	340-280
2	5.0-15.0	180-117
3	16.0-34.0	113-67
4	15.0-35.0	117-65
4L	15.0-35.0	117-65
5	28.0-52.0	79-33
6	36.0-54.0	63-29
7	36.0-64.0	63-17
8	--	--

Wind erodability group (WEG) estimates should be based on dry soil aggregate sieving of the soil or of similar soil. If data are not available, estimates can be made using other properties as a guide.

Texture of the surface inch of soil has the greatest single influence of soil erodability and is used as a guide for estimating wind erodability groups.

Source: Soil Conservation Service, Handbook for Interpretation,
Draft KKy, February 11, 1972.

GUIDE FOR ESTIMATING WIND ERODABILITY GROUP (WEG) FROM SOIL TEXTURES

Texture of Surface Inch*	WEG
Very fine sand, fine sand and medium sand	1
Loamy sand, loamy fine sand	2
Very fine sandy loam, fine sandy loam, sand loam	3
Clay, silty clay, noncalcareous clay loam and silty clay loam with more than 35% clay content	4
Calcareous loam and silt loam; calcareous clay loam and silty clay loam with less than 35% clay content	4L
Noncalcareous loam and silt loam with less than 20% clay content; sandy clay loam, sandy clay	5
Noncalcareous loam and silt loam with more than 20% clay content; noncalcareous clay loam with less than 35% clay content	6
Silt; noncalcareous silty clay loam with less than 35% clay content	7
Very wet or stony; not subject to wind erosion	8

*Samples were taken of the surface horizon and it is assumed that the surface inch of soil is the same texture.

Source: Soil Conservation Service, Handbook for Interpretations, Draft KKy, February 11, 1972.

Wind Erodability Soil Groups in the Northern Great Plains

For Use in Predicting Soil Losses by Wind and Determining Alternative Land Treatments for Soil Protection

Wind erodibility soil group 1/	Predominant soil classes
1	Very fine, fine, and medium sand and dune sand.
2	Loamy very fine, fine, and medium sands.
3	Very fine, fine, medium, and coarse sandy loams.
4	Clays, silty clays (subject to granulation).
5	Loams, sandy clay loams, sandy clays.
6	Silt loams, clay loams.
7	Silty clay loams, silt.
8	Soils subject to wetness, stoniness, etc., and not subject to wind erosion.

1/ Group 1. Mostly dune sand; single grain structure; vegetation difficult to establish; not suitable for cropland.

Group 2. Mostly loamy sands; dry clod structure (as indicated by percentage of dry soil aggregates >0.84 mm. in diameter) is weak; requires a combination of intensive practices to control wind erosion.

Group 3. Mostly sandy loams; dry clod structure moderately stable; requires at least two measures to control wind erosion in regions with high and intermediate climatic factor.

Group 4. Mostly clays and silty clays; dry clod structure extremely variable due to contraction and swelling by freezing and thawing and wetting and drying; need a combination of at least two measures in regions with high and intermediate climatic factor.

Group 5. Mostly loams and sandy clay loams; dry clod structure quite stable; a combination of at least two measures is needed in a region with high climatic factor.

Group 6. Mostly silt loams and clay loams; dry clod structure stable; require a combination of at least two measures in a region with high climatic factor.

Group 7. Mostly silty clay loams; dry clod structure extremely stable; usually a single practice is sufficient to control wind erosion.

Group 8. Soils not suitable for crops because of wetness, stoniness, etc.

Source: Soil Conservation Service, Handbook for Interpretation, Draft Kky, February 11, 1972.

APPENDIX B-2-5

Method For Determining Evaporation Losses From Reservoirs

Evaporation from an earthfill reservoir is influenced by its shape, which Smith (1974) approximates as a pyramid. To determine evaporation volume the assumptions that reservoirs fill each year and that net evaporation is 3.92 feet per year (Smith 1974) are made. The average volume of BLM earthfill reservoirs in the Seven Lakes is 5.5 acre feet with an average depth of 5 feet.

$V = 1/3\ AH$, where
V = Volume,
A = Surface Area, and
H = Height or Depth of Water

Since $V = 5.5$ acre-feet and $H = 5$ feet, $A = 3.3$ acres. Side slopes are 3:1 and depth after evaporation is $H = 5 - 3.92 = 1.08$ feet. Therefore, $A = 3.25$ acres after evaporation and $V = 1/3\ (3.25)\ (1.08) = 1.17$ acre-feet after evaporation. The volume evaporated each year $V_E = 5.5 - 1.17 = 4.33$ acre-feet.

With seventeen BLM reservoirs in the ES area, total reservoir evaporation would be 17 x 4.33 = 73.61 acre-feet per year.

APPENDIX B-2-6

Determination of Visual Resource Management (VRM) Classes

VRM classes comprise scenery quality, visual sensitivity levels, and distance zones.

Scenery quality is determined from a quantified scenic evaluation process. Three quality ratings result: outstanding (a), characteristic (b), and minimal (c).

Visual sensitivity levels are an index of the relative importance or value of visual response to an area. Commonly considered criteria are:

1. Traffic counts for highways and roads;
2. Recreation uses of public land types, use counts, local, regional, national significance;
3. Community attitudes;
4. Land use relationships.

Distance zones are important because, in most cases, the closer viewers are to an object, the more contrast or detail they see. The distance zones are:

1. Foreground: from 0 mile to 0.5-1 mile;
2. middleground: from 0.5-1 mile to 3-5 miles;
3. background: from 3-5 miles to 15 miles;
4. seldom seen: beyond 15 miles or in closer areas which are screened by landform or vegetation from the common viewing points. After the above VRM class combinations are determined, they are then compared with a chart to determine the VRM classes.

Determination of Visual Impact

Whether or not a proposed project would create a visual impact is determined through the use of a contrast rating. Each type of proposed project is quantitatively analyzed to determine (predict) what contrast each would create in the foreground, middleground, and background distance zones, i.e., what deviations from the form, line, color, and texture of the surface and vegetation were caused by the addition of structures or alterations to the existing landscapes. Initially, this analysis is not site specific, but assumes optimum viewing conditions. The contrast ratings (numerical scores) are then compared with the numerical limits for each VRM class. Contrast ratings greater than the limits for the VRM classes create discordant deviations and are considered to be visual impacts. Those contrast ratings within the limits of the VRM classes create harmonious deviations and are not considered to be visual impacts. Contrast ratings were prepared for each type of activity expected under the proposed action and each alternative for the "worst case" in each of the landscape types. Table 3-10, Visual Contrast Rating Summary (see Chapter 3), displays the results of this step of the analysis. The next step carries the analysis to the site specific or project level. Every proposed project is examined to see in which VRM class area it lies and is analyzed for design and visibility characteristics which may increase or decrease the contrast rating and consequently visual impact.

Impact Mitigation

Mitigation of visual impacts involves implementation of design measures to reduce the contrast changes to landform and vegetation caused by the addition of structures or alterations to the existing environment, to bring the numerical scores for contrasts within or as close as possible to the limits for the VRM class.

APPENDIX B-2-7

Description of the Methodology Used to Determine the Forage Production in the Seven Lakes ES Area

During the summer months of 1975 and 1976, BLM temporary employees (college students in the natural resources field) under the supervision of a BLM range conservationist collected field data using the BLM Weight Estimate Forage Inventory Method (BLM Manual 4412.11B). Prior to the field work, the vegetation was grouped into relatively homogeneous types using color infrared aerial photographs and a 1958 range survey of the area. Vegetative type boundary lines later were further refined in the field as necessary. Delineation of vegetation types was based on differences in vegetative species, slope, exposure, or abundance of the vegetation. Field work was done from June to October.

Circular frames measuring 9.6 square feet were located in each vegetation type. The 9.6 square foot area of the frame was considered to be one plot from which clipping takes place and was used because measurements in grams per 9.6 square feet convert directly to pounds per acre. Initially, all of the current year's vegetative production was clipped and weighed in grams by plant species. The weight of the forage production in subsequent plots was estimated based on the findings of the clipped and weighed plots. A minimum of 10% of the plots were actually clipped, and approximately three plots were distributed per square mile, but each type contained at least one plot. Vegetation types smaller than 160 acres were not mapped except for some high production areas (meadows).

For each range vegetation type delineated a type write-up was made on BLM Standard Form 4412.4 (see Example A) and summarized on a vegetation type data work sheet (see Example B). Each type was given an identification label derived from the examiner's initials plus a number.

For example, Lucy Malin and Bruce Easton would designate the types they examined as ME-1, ME-2, ME-3, etc. Generally, two employees would work together as a team, and there were three teams each year. The teams surveyed all the vegetation types found on private or state lands. They used 7.5 minute USGS topographic quadrangles to determine precise locations.

Clipped vegetation of each species was saved, weighed, air dried for one week, and then weighed again in order to determine the dry weight production. Clipping and weighing measurements were done on a weekly basis for each species because of changes in moisture status of the range plants, except for the area in Fremont County which was done on a monthly basis.

Based on the information collected as described previously, the number of pounds per acre (on a dry weight basis) of production of each species in a given vegetation type was computed. Next a proper use factor (PUF), which represents the average weight percentage of a particular plant species' current year's growth which can be safely grazed by a specific animal species without harming the plant production, was multiplied by the production figure in pounds, dry weight, per acre (LBS. DW/AC) for a given species in a particular vegetation type. The attached proper use table was used to determine the correct factor to use. Because the summer grazing season in the ES area is from May through October, the summer and fall values from the table were averaged together to derive a summer use factor. Also, the table was deviated from slightly in the case of certain plant species. For example, some use of *Artemisia tridentata* by cattle in the summer is normal, so instead of the zero value found in the table, 5% was substituted. Similarly, 50% was used as the proper use factor of *Sitanion hysterix* for winter sheep, and 20% was used as the proper use factor of *Eurotia lanata* for yearlong horses. Thus, the pounds of properly usable forage per acre in each vegetation type were calculated by multiplying the PUF times the pounds per acre of each species and totaling the products of all the species. The acreages of each type were determined using 7.5 minute USGS topographic quadrangles, and these acreages were then used to compute the total production of usable forage in pounds for each vegetation type by multiplying the number of acres that a vegetation type covered times the pounds of properly usable forage per acre which occurred in that type. Portions of the ES area were not available in 7.5 minute USGS topographic quadrangles; therefore, the existing 15 minute USGS quadrangles were expanded to the 7.5 minute scale.

The usable forage production (in pounds) of each type was divided by the number of pounds needed for an animal unit month (AUM) of a specific class and season of livestock. Seven hundred and eighty pounds of properly usable forage was used as an equivalent for one summer cattle AUM, 450 pounds equalled one winter sheep AUM (this represents 90 pounds per head of sheep), and 900 pounds equalled one yearlong wild horse AUM. Seven hundred and fifty pounds was used to equal one summer sheep AUM (this represents 150 pounds per head of sheep) and 780 pounds was used to equal one winter cattle AUM. AUMs for summer cattle, winter sheep, summer sheep, winter cattle, and yearlong horses were calculated separately for each vegetation type.

Finally, all the data were compiled on maps, and tabulated both by vegetation type and by section for each of the proposed pastures in the allotments. An overlay for each topographic map was prepared which displays the acreage for each vegetation type in each section per land status. Current grazing capacity for summer cattle, winter cattle, summer sheep, winter sheep, and yearlong horses expressed in AUMs is also displayed in a like manner. These overlays and maps, as well as the type writeups are available for public inspection in the Rawlins District Office.

The amount of properly usable forage determined by the survey is expressed as AUMs for one of the following: cattle grazing in the summer or cattle grazing in the winter or sheep grazing in the summer or sheep grazing in the winter or horses grazing year-round. The properly usable AUMs vary with the season of use and the class of grazing animal because the proper use factors discussed above and the forage requirements of the animals vary with the season of use and the class of grazing animals. The properly usable AUMs have been expressed on a common basis throughout this environmental statement where it was necessary to do so in order to make comparisons between use by different classes of grazing animals. Winter sheep AUMs were chosen as the common basis because winter sheep constitute the greatest use under the present and proposed action. For example, if an allotment was shown in the range survey to have 20,000 AUMs of forage for winter sheep grazing or 10,000 AUMs of forage for summer cattle grazing, the ratio of properly usable winter sheep AUMs to summer cattle AUMs is 2:1. To express cattle use in that allotment on a winter sheep basis, the proposed cattle use in AUMs would be multiplied by two (see Appendix B-1-1). Two thousand AUMs of summer cattle use would be expressed as 4,000 winter sheep AUMs.

EXAMPLE A
FORAGE SURVEY TYPE WRITE-UP
(WEIGHT ESTIMATE METHOD)

Examiner: Buettgenbach
Write up No.: TB-32
Date: 10-7-75
Type: 14-Save-Agda-Disip

Kind of Animal: Cattle
Antelope
Season of Use: Sp-S-F
Yearlong

Township: 24
Range: 94

	PLOT RECORD OR SHEET SUMMARY OF GREEN WEIGHT														PUF		LBS. UF/Ac	
SPECIES	1	2	3	4	5	6	7	8	9	10	TOTAL	LBS. GW/Ac	% DRY WT.	LBS DW/Ac	Use Com-plex	Non-Comp. Game	Use Com-plex	Non-Comp. Game
GRASSES																		
Sihy	1										1	1.7	100	1.7				
Agda		20	10		10	10					50	83.3	100	83.3				
Orhy		5		15	1	5					26	43.3	90	38.97				
Distsp				10							10	16.7	73	12.19				
FORBS																		
Eriog						1					1	1.7	100	1.7				
SHRUBS																		
Atnu	10	1	5								16	26.7	55	14.69				
Koam	1	1	1								3	5	60	3				
Chla		1		1							2	3.3	73	2.41				
Arsp			1								1	1.67	70	1.17				
Save			25			30					55	91.67	79	72.42				
Artr						1					1	1.67	64	1.07				
Arfr						1					1	1.67	83	1.39				
TOTALS	12	28	42	26	11	48					167	278.38		234.01				

Use Complex 73.22 lbs. UF/Ac (tot.) x 100% Utilizable = 73.22 lbs. UF/Ac (Net); 780 lbs./AUM (forage req.) ÷ 73.22 lbs. UF/Ac (Net) = 11 Ac/AUM.
Noncompetetive Game 12.64 lbs. UF/Ac (tot.) x 100% Utilizable = 12.64 lbs. UF/Ac (Net); 780 lbs./AUM (forage req.) + 12.64 lbs. UF/Ac (Net) = 62 Ac/AUM.

EXAMPLE B
VEGETATION TYPE DATA WORK SHEET

Examiner:
Buettgenbach

Type No.: TB-32

		Season of Use Summer Year Round		Kind of Animal Cattle Antelope		Season of Use Winter Year Round		Kind of Animal Cattle Antelope		Season of Use Summer Year Round		Kind of Animal Sheep Antelope	
		PUF		LBS. UF/Ac		PUF		LBS. UF/Ac		PUF		LBS. UF/Ac	
SPECIES	LBS. DW/Ac	Use Complex	Non-Comp. Game	Use Complex	Non-Comp. Game	Use Complex	Non-Comp. Game	Use Complex	Non-Comp. Game	Use Complex	Non-Comp. Game	Use Complex	Non-Comp. Game
GRASSES													
Sihy	2	40		.8		50		1		40		.8	
Agda	83	40		33.2		50		41.5		30		24.9	
Ordy	39	45		17.55		50		19.5		35		13.65	
Dist	12	30		3.6		20		2.4		5		0.6	
FORBS													
Eriog	2	10	10	0.2	0.2	5	2	0.1	0.4	25		0.5	
SHRUBS													
Atnu	15	20		3		35		5.25		28		4.2	
Koam	3	10	33	0.3	0.99	10	33	0.3	0.99	40		1.2	
Chvi	2	5	30	0.1	0.6	8	27	0.16	0.54	20	10	0.4	0.2
Arsp	1	10	10	0.1	0.1	10	10	0.1	0.1	25		0.25	
Save	72	10		7.2		10		7.2			5	0	3.6
Artr	1	5	28	0.05	0.28	5	28	0.05	0.28	13	20	0.13	0.2
Arfr	1	10	10	0.1	0.1	10	10	0.1	0.1	15		0.15	
TOTALS	233			66.2	2.27			77.66	2.41			46.78	4.0

EXAMPLE B (CONTINUED)
VEGETATION TYPE DATA WORK SHEET

Examiner:
Buettgenbach

Type No.: TB-32

		Season of Use		Kind of Animal		Season of Use		Kind of Animal	
		Winter		Sheep		Year Round		Wild Horses	
		Year Round		Antelope		Year Round		Antelope	
		PUF		LBS. UF/Ac		PUF		LBS. UF/Ac	
SPECIES	LBS. DW/Ac	Use Com- plex	Non- Comp. Game	Use Com- plex	Non- Comp. Game	Use Com- plex	Non- Comp. Game	Use Com- plex	Non- Comp. Game
GRASSES									
Sihy	2	50		1		40	6	0.8	0.12
Agda	83	30		24.9		40	0	33.2	0
Ordy	39	40		15.6		45	5	17.55	1.95
Dist	12	10		1.2		30	5	3.6	0.6
FORBS									
Eriog	2	10	10	0.2	0.2	8	22	0.16	0.44
SHRUBS									
Atnu	15	35		5.25		8	20	1.2	3
Koam	3	30		0.9		8	42	0.24	1.26
Chvi	2	20	10	0.4	0.2	0	35	0	0.7
Arsp	1	30		0.3		0	25	0	0.25
Save	72	0	5	0	3.6	0	5	0	3.6
Artr	1	20	10	0.2	0.1	0	33	0	0.33
Arfr	1	20		0.2		5	20	0.05	0.2
TOTALS	233			50.15	4.1			56.8	12.45

EXAMPLE B (CONTINUED)
VEGETATION TYPE DATA WORK SHEET

Use Complex 66.2 lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
780 lbs./AUM (forage req.) ÷ 66.2 lbs. UF/Ac (Net) = 11.78 Ac/AUM.
Noncompetetive Game ____ lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
780 lbs./AUM (forage req.) ÷ 2.27 lbs. UF/Ac (Net) = 343.61 Ac/AUM.

12 10
16 9
16

Use Complex ____ lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
780 lbs./AUM (forage req.) ÷ 77.66 lbs. UF/Ac (Net) = 10.04 Ac/AUM.
Noncompetetive Game ____ lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
780 lbs./AUM (forage req.) ÷ 2.41 lbs. UF/Ac (Net) = 323.65 Ac/AUM.

Use Complex ____ lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
750 lbs./AUM (forage req.) ÷ 46.78 lbs. UF/Ac (Net) = 16.03 Ac/AUM.
Noncompetetive Game ____ lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
750 lbs./AUM (forage req.) ÷ 4.0 lbs. UF/Ac (Net) = 187.50 Ac/AUM.

Use Complex ____ lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
450 lbs./AUM (forage req.) ÷ 50.15 lbs. UF/Ac (Net) = 8.97 Ac/AUM.
Noncompetetive Game ____ lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
450 lbs./AUM (forage req.) ÷ 4.1 lbs. UF/Ac (Net) = 109.76 Ac/AUM.

Use Complex ____ lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
900 lbs./AUM (forage req.) ÷ 56.8 lbs. UF/Ac (Net) = 15.85 Ac/AUM.
Noncompetetive Game ____ lbs. UF/Ac (tot.) x 100% Utilizable = ____lbs. UF/Ac (Net);
900 lbs./AUM (forage req.) ÷ 12.45 lbs. UF/Ac (Net) = 72.29 Ac/AUM.

PROPER USE TABLE
RAWLINS DISTRICT OFFICE JUNE 1975

SYMBOL	SCIENTIFIC NAME	COMMON NAME	Cattle				Horses				Sheep				Antelope				Deer				Elk			
			S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W
GRASSES:																										
Agda	Agropyron dasystachyum	Thickspike wheatgrass	40	30	50	50	40	30	50	40	40	30	30	30	0	0	0	0	5	5	0	0	40	30	50	50
Agel	Agropyron elongatum	Tall wheatgrass	40	30	50	50	40	30	50	40	40	30	30	30	0	0	0	0	5	5	0	0	40	30	50	50
Agre	Agropyron repens	Quackgrass	30	30	50	50	30	30	50	50	30	30	30	30	5	0	5	0	5	0	5	0	30	30	50	50
Agri	Agropyron reparium	Streambank wheatgrass	40	30	50	50	40	30	50	40	40	30	30	30	0	0	0	0	5	5	0	0	40	30	50	50
Agsm	Agropyron smithii	Western wheatgrass	40	30	50	50	40	30	50	40	40	30	30	30	0	0	0	0	5	5	0	0	40	30	50	50
Agsp	Agropyron spicatum	Bluebunch wheatgrass	30	30	50	50	30	30	50	50	30	30	40	40	5	5	5	5	10	5	10	15	30	30	50	50
Agtr	Agropyron trachycaulum	Slender wheatgrass	40	30	50	50	40	30	50	50	40	30	30	30	0	0	0	0	5	5	0	0	40	30	50	50
Agcr	Agropyron cristatum	Crested wheatgrass	30	30	50	50	30	30	50	50	30	30	40	40	5	5	5	5	10	5	10	15	30	30	50	50
Agin	Agropyron inerme	Beardless wheatgrass	40	30	50	50	40	30	50	50	40	30	30	30	5	5	5	5	5	5	5	5	40	30	50	50
Agsu	Agropyron subsecundum	Bearded wheatgrass	40	30	50	50	40	30	50	50	40	30	30	30	5	5	5	5	5	5	5	5	40	30	50	50
Arel	Arrhenatherum elatius	Tall oatgrass	30	30	40	40	30	30	40	40	20	20	30	30	5	5	5	5	5	5	5	5	30	30	40	40
Agal	Agrostis alba	Redtop	40	30	50	50	40	30	50	50	40	30	30	30	5	5	5	5	5	5	5	5	40	30	50	50
Bogr	Bouteloua gracilis	Blue grama	50	50	50	50	50	50	50	50	30	50	40	40	5	5	5	0	5	5	5	0	50	50	50	50
Brin	Bromus inermis	Smooth Brome	40	30	50	50	40	30	50	50	40	30	30	30	5	5	5	5	10	5	10	50	40	30	50	50
Brci	Bromus ciliatus	Fringed brome	40	50	50	50	40	50	50	50	40	40	40	30	5	5	0	0	10	5	10	15	40	50	50	50
Brma	Bromus marginatus	Mountain brome	40	50	50	50	40	50	50	50	40	40	40	30	5	5	0	0	10	5	10	15	40	50	50	50
Caca	Calamagrostis canadensis	Bluejoint	40	30	20	20	40	30	20	20	5	5	5	5	0	0	0	0	0	0	0	0	40	30	20	20
Caru	Calamagrostis rubescens	Pinegrass	40	30	20	20	40	30	20	20	5	5	5	5	0	0	0	0	0	0	0	0	40	30	20	20
Cain	Calamagrostis inexpansa	Northern reedgrass	40	30	20	20	40	30	20	20	5	5	5	5	0	0	0	0	0	0	0	0	40	30	20	20
Dasp	Danthonia spicata	Poverty oatgrass	20	5	5	0	20	5	5	0	20	5	5	0	0	0	0	0	0	0	0	0	20	5	5	0
Deca	Deschampsia caespitosa	Tufted hairgrass	40	30	50	50	40	30	50	50	20	20	20	20	10	10	10	10	10	10	10	10	40	30	50	50
Dist	Distichlis stricta	Desert saltgrass	40	40	20	20	40	40	20	20	20	0	10	10	5	5	5	5	5	5	5	5	40	40	40	40
Elci	Elymus cinereus	Great Basin wildrye	30	30	40	40	30	30	40	40	10	10	10	10	0	0	0	0	0	0	0	0	30	30	40	40
Elca	Elymus canadensis	Canada wildrye	30	30	40	40	30	30	40	40	10	10	10	10	0	0	0	0	0	0	0	0	30	30	40	40
Elmo	Elymus mollis	American dunegrass	30	30	40	40	30	30	40	40	10	10	10	10	0	0	0	0	0	0	0	0	30	30	40	40
Erag	Eragrostis spp.	Lovegrass	30	30	30	30	30	30	30	30	30	30	30	30	5	5	5	5	5	5	5	5	30	30	30	30
Erhy	Eragrostis hypnoides	Creeping lovegrass	30	30	30	30	30	30	30	30	30	30	30	30	5	5	5	5	5	5	5	5	30	30	30	30
Feid	Festuca idohoinsis	Idaho fescue	40	30	50	50	30	40	50	50	40	30	50	40	5	5	5	5	5	5	5	5	40	30	50	50
Fesc	Festuca scabrella	Rough fescue	40	30	50	50	30	40	50	50	40	30	50	40	10	5	5	5	5	5	5	5	40	30	50	50
Glst	Glyceria striata	Fowl manngrass	20	20	20	20	20	20	20	20	10	10	10	10	5	5	5	5	5	5	5	5	20	20	20	20
Heki	Hesperochloa kingii	Spike fescue	40	30	50	50	40	30	50	50	40	30	50	30	10	5	5	5	10	5	10	10	40	40	50	50
Hija	Hilaria jamesii	Galleta	40	30	50	50	40	30	50	50	40	30	20	30	5	5	0	0	5	5	0	0	40	30	50	50
Hoju	Hordeum jubatum	Foxtail barley	40	20	20	20	40	20	20	20	40	20	20	20	5	5	5	5	5	5	5	5	40	20	20	20

PROPER USE TABLE (CONTINUED)
RAWLINS DISTRICT OFFICE JUNE 1975

			Cattle				Horses				Sheep				Antelope				Deer				Elk			
SYMBOL	SCIENTIFIC NAME	COMMON NAME	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W
GRASSES:																										
Hobr	Hordeum brachyantherum	Meadow barley	40	20	20	20	40	20	20	20	40	40	40	40	5	5	5	5	5	5	5	5	40	20	20	20
Kocr	Koelaria cristata	Junegrass	40	30	50	50	40	30	50	50	30	30	40	40	5	5	0	0	5	5	0	0	40	30	50	50
Mebu	Melica bullbosa	Oniongrass	40	40	50	50	40	40	50	50	30	30	50	20	5	5	0	0	5	5	0	0	40	40	50	50
Mupu	Muhlenbergia pungens	Sandhill muhly	30	30	40	40	30	30	40	40	10	10	10	10	5	5	5	5	5	5	5	5	30	30	40	40
Mura	Muhlenbergia racemosa	Muhly	30	30	40	40	30	30	40	40	10	10	10	10	5	5	5	5	5	5	5	5	30	30	40	40
Orhy	Oryzopsis hymenoides	Indian ricegrass	40	40	50	50	40	40	50	50	40	30	40	40	10	5	5	5	10	5	5	5	40	40	50	50
Orex	Oryzopsis exigua	Little ricegrass	40	40	50	50	40	40	50	50	40	30	40	40	10	5	5	5	10	5	5	5	40	40	50	50
Phal	Phleum apinum	Alpine timothy	40	40	50	50	40	40	50	50	30	30	40	40	10	5	5	5	10	5	5	5	40	40	50	50
Phpr	Phleum pratense	Timothy	40	40	50	50	40	40	50	50	30	30	40	40	10	5	5	5	10	5	5	5	40	40	50	50
Poco	Poa compressa	Canada bluebrass	30	30	50	50	30	30	50	50	30	30	50	50	10	5	5	5	10	5	10	15	30	30	50	50
Pofe	Poa fendleriana	Muttongrass	30	30	50	50	30	30	50	50	30	30	50	50	10	5	5	5	10	5	10	15	30	30	50	50
Popr	Poa pratensis	Kentucky bluegrass	40	40	50	50	30	30	50	50	30	30	50	50	10	5	5	5	10	5	10	15	30	30	50	50
Pose	Poa secunda	Sandberg bluegrass	30	30	50	50	30	30	50	50	30	30	50	40	10	5	5	5	10	5	10	15	30	30	50	50
Scpa	Schedonnardus paniculatus	Tumblegrass	30	30	40	40	30	30	40	40	10	10	20	20	10	5	5	5	10	5	5	5	30	30	50	50
Sihy	Sitanion hystrix	Squirreltail	30	30	50	50	30	30	50	50	30	30	50	40	10	5	5	5	10	5	5	5	30	30	50	50
Spgr	Spartina gracilis	Alkali cordgrass	10	10	20	20	10	10	20	20	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0
Sppe	Spartina pectinata	Prairie cordgrass	10	10	20	20	10	10	20	20	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0
Spai	Sporobolus airoides	Alkali sacaton	20	20	20	20	20	20	20	20	10	10	10	10	5	5	5	5	5	5	5	5	20	20	20	20
Spcr	Sporobolus cryptandrus	Sand dropseed	30	40	50	50	30	40	50	50	10	10	20	20	5	5	5	5	5	5	5	5	30	40	50	50
Stco	Stipa comata	Needle-and-thread	40	40	50	50	40	40	50	50	30	30	50	30	10	5	5	5	10	5	10	10	40	40	50	50
Stcor	Stipa coronata	Needlegrass	40	40	50	50	40	40	50	50	30	30	50	30	10	5	5	5	10	5	10	10	40	40	50	50
Stpi	Stipa pinatorum	Pine needle grass	40	40	50	50	40	40	50	50	30	30	50	30	10	5	5	5	10	5	10	10	40	40	50	50
Stle	Stipa letermanii	Letterman needlegrass	40	40	50	50	40	40	50	50	30	30	50	30	10	5	5	5	10	5	10	10	40	40	50	50
Stoc	Stipa occidentalis	Western needlegrass	40	40	50	50	40	40	50	50	30	30	50	30	10	5	5	5	10	5	10	10	40	40	50	50
Stsp	Stipa spartea	Porcupinegrass	30	30	50	50	20	30	50	50	10	10	40	40	5	5	5	5	5	5	5	5	30	30	50	50
Stvi	Stipa viridula	Green needlegrass	40	40	50	50	40	40	50	50	30	30	50	30	10	5	5	5	10	5	10	10	40	40	50	50
SETA	Setaria spp.	Bristlegrass	20	20	40	40	20	20	40	40	10	10	30	30	5	5	5	5	5	5	5	5	20	20	40	40
Topa	Torreyochloa pauciflora	Weak falsemanna	20	20	40	40	20	20	40	40	10	10	30	30	5	5	5	5	5	5	5	5	20	20	40	40

PROPER USE TABLE (CONTINUED)
RAWLINS DISTRICT OFFICE JUNE 1975

			Cattle				Horses				Sheep				Antelope				Deer				Elk			
SYMBOL	SCIENTIFIC NAME	COMMON NAME	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W
GRASSLIKE PLANTS:																										
Caaq	Carex aquatilis	Water sedge	10	10	20	20	10	10	20	20	0	0	0	0	0	0	0	0	0	0	0	0	10	10	20	20
Cado	Carex douglasii	Sedge	20	20	30	30	20	20	30	30	10	10	20	20	5	5	5	5	5	5	5	5	10	10	20	20
Cafe	Carex festivella	Ovalhead sedge	20	20	30	30	20	20	30	30	10	10	20	20	5	5	5	5	5	5	5	5	10	10	20	20
Cafi	Carex filifolia	Threadleaf sedge	20	20	30	30	20	20	30	30	10	10	20	20	5	5	5	5	5	5	5	5	10	10	20	10
Cane	Carex nebraskensis	Nebraska sedge	20	20	30	30	20	20	30	30	10	10	20	20	5	5	5	5	5	5	5	5	10	10	20	10
Cage	Carex geyeri	Elk sedge	30	30	40	40	30	30	40	40	20	20	30	30	5	5	5	5	5	5	5	5	30	30	40	40
EQUI	Equisetum spp.	Horsetail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0	0
Elma	Eleocharis macrostachya	Spikerush	30	30	40	40	30	30	40	40	20	20	30	30	0	0	0	0	5	0	0	0	30	30	40	40
Juba	Juncus balticus	Wire rush	20	20	30	30	20	20	30	30	10	10	20	20	0	0	0	0	5	0	0	0	20	20	30	30
Cymi	Cyperus microcarpus	Bullrush	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Simo	Sisyrinchium montanum	Blue-eyed grass	20	20	30	30	20	20	30	30	10	10	20	20	5	5	5	5	5	5	5	5	20	20	30	30
FORBS:																										
Acla	Achillea lanulosa	Western yarrow	20	20	30	30	20	20	30	30	30	30	50	50	30	30	50	50	30	30	50	50	20	30	30	30
Aggl	Agoseris glauca	Smooth mountain-dandelion	30	30	30	20	5	5	5	5	30	30	30	30	30	30	30	40	30	30	30	40	10	10	10	10
ALLI	Allium spp.	Onion	10	10	10	0	0	0	0	0	30	30	30	30	30	30	40	40	30	30	40	40	10	10	10	0
ANTE	Antennaria spp.	Pussytoes	0	0	0	0	0	0	0	0	10	10	10	10	5	5	5	5	5	5	5	5	0	0	0	0
Arlu	Artemusia ludoviciana	Sagewort (wormwood)	10	10	10	10	0	0	0	0	20	20	20	20	20	20	30	30	20	20	30	30	0	0	0	0
AQUI	Awuilrhis spp.	Columbine	0	0	0	0	0	0	0	0	10	10	10	10	0	0	0	0	10	10	10	10	0	0	0	0
AREN	Arenaria spp.	Sandwort	0	0	0	0	0	0	0	0	10	10	10	10	5	5	5	5	5	5	5	5	0	0	0	0
ASTE	Aster spp.	Aster	0	0	0	0	0	0	0	0	20	20	20	50	20	20	20	20	50	20	20	20	40	0	0	0
ASTR	Astragalus spp.	Loco weed	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0	0								
Basa	Balsamorhiza sagittata	Arrowleaf balsamroot	20	30	30	20	5	5	5	0	20	20	40	40	10	10	10	10	10	10	10	10	10	30	30	20
CAST	Castilleia spp.	Paintbrush	10	5	5	0	0	0	0	0	20	20	20	20	20	20	20	20	30	20	20	20	10	10	10	10
ERIO	Eriogonum spp.	Wild buckwheat	10	10	10	0	10	10	10	0	30	20	30	10	30	30	30	30	30	20	20	10	10	10	10	0
ERIG	Erigeron spp.	Fleabane	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0
GERA	Geranium spp.	Geranium	20	20	30	30	20	20	30	30	30	30	50	50	30	30	40	40	30	30	40	40	20	20	30	30
HAPL	Haplopappus spp.	Goldenrod	0	0	0	0	0	0	0	0	0	0	0	40	0	0	0	40								
LUPI	Lupinus spp.	Lupine	10	5	10	10	10	5	10	10	15	15	15	15	15	15	15	15								

PROPER USE TABLE (CONTINUED)
RAWLINS DISTRICT OFFICE JUNE 1975

SYMBOL	SCIENTIFIC NAME	COMMON NAME	Cattle				Horses				Sheep				Antelope				Deer				Elk			
			S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W
FORBS:																										
Meal	Melilotus albus	White sweetclover	40	40	50	30	40	40	50	30	40	40	50	30	40	40	40	30	40	40	40	30	40	40	50	30
Meof	Melilotus officinalis	Yellow sweetclover	40	40	50	30	40	40	50	40	40	40	50	30	40	40	40	30	40	40	40	30	40	40	50	30
ORTH	Orthocarpus spp.	Owl clover	0	0	0	0	0	0	0	0	10	0	0	0	10	0	0	0								
OXYT	Oxytropis spp.	Crazyweed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
PENT	Pentstemon spp.	Pentstemon	10	20	0	0	10	20	0	0	20	20	10	10	20	20	10	10								
PHLO	Phlox spp.	Phlox	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10	5	5	5	5
PSOR	Psoralea spp.	Scurfpea	10	10	10	10	10	10	10	10	20	20	20	20	20	20	20	20	20	20	20	20	10	10	10	10
Taof	Taraxacum officinale	Dandelion	20	20	10	0	10	10	10	0	40	40	40	10	40	40	40	10	40	40	40	10	20	20	20	10
SHRUBS:																										
AMEL	Amelanchier spp.	Serviceberry	10	10	50	50	10	10	50	50	20	20	50	50	30	30	50	50	30	30	50	50	10	10	50	50
Aruv	Archtostaphyloa uva-ursi	Bearberry	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0	0	10	10	20	20	10	10	20	20
Arar	Artemisia arbuscula	Low sagebrush	5	0	15	20	5	0	15	20	10	5	30	30	15	15	50	50	10	10	40	40	30	30	5	10
Arca	Artemisia cana	Silver sagebrush	10	10	50	50	10	10	50	50	20	20	50	50	30	30	50	50	30	30	50	50	20	20	50	50
Arfr	Artemisia frigida	Fringed sagebrush	10	10	10	10	5	5	5	5	10	10	20	20	10	10	30	30	10	10	20	20	10	10	10	10
Arno	Artemisia nova	Black sagebrush	5	5	10	10	0	0	0	0	10	10	30	30	20	20	50	50	20	20	50	50	20	5	10	50
Arpe	Artemisia pedatifida	Birdfoot sagebrush	5	5	10	10	0	0	0	0	10	10	30	30	0	10	10	0	10	10	20	20	5	5	10	10
Arsp	Artemisia spinescens	Bud sagebrush	10	10	10	10	0	0	0	0	20	20	30	30	20	20	30	30	10	10	10	30	10	10	10	10
Artr-1	Artemisia tridentata	Big sagebrush	5	0	0	5	0	0	0	0	10	5	20	20	15	15	50	50	10	10	40	50	30	5	10	50
Artr-2	Artemisia tripartita	Threetip sagebrush	5	0	0	5	0	0	0	0	10	5	30	30	20	20	50	50	20	20	50	50	20	5	10	50
Atca	Atriplex canescens	Fourwing saltbush	20	20	30	30	5	5	5	5	30	40	50	50	30	30	40	40	30	30	40	40	20	10	20	20
Atco	Atriplex confertifolia	Shadscale	5	5	35	35	0	0	20	10	20	20	35	35	5	5	35	35	5	5	10	10	0	0	10	50
Atnu	Atriplex nuttallii	Nutall saltbush	5	5	35	35	0	0	20	10	20	20	35	35	5	5	35	35	5	5	10	10	0	0	10	50
CEAN	Ceanothus spp.	Snowbrush	0	0	0	0	0	0	0	0	5	5	10	10	0	0	0	0	5	5	10	10	0	0	10	10
Cemo	Cercocarpus montanus	Mountain mahogany	30	20	30	50	30	20	30	50	30	20	30	50	30	30	30	50	30	30	50	50	30	20	30	50
Cele	Cercocarpus ledifolius	Curlleaf mountain mahogany	30	20	30	50	30	20	30	50	30	20	30	50	30	30	30	50	20	30	50	50	30	20	35	50
Chna	Chrysothamnus nauseosus	Rubber rabbitbrush	0	0	0	0	0	0	0	0	20	20	20	20	30	30	30	50	20	20	20	40	10	10	10	10
Chui	Chrysothamnus viscidiflorus	Douglas rabbitbrush	0	5	5	10	0	0	0	0	20	20	20	20	30	30	30	50	20	20	20	40	10	10	10	10
CRAT	Crateogus spp.	Hawthorne	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	10	10	20	20	0	0	10	10

PROPER USE TABLE (CONTINUED)
RAWLINS DISTRICT OFFICE JUNE 1975

			Cattle				Horses				Sheep				Antelope				Deer				Elk			
SYMBOL	SCIENTIFIC NAME	COMMON NAME	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W	S	S	F	W
SHRUBS:																										
ERIO	Eriogonum spp.	Eriogonum	5	5	10	10	0	0	0	0	20	20	40	40	30	30	30	40	20	20	20	40	20	20	20	30
Eula	Eurotia lanata	Winterfat (White sage)	25	25	50	50	20	20	40	40	25	25	50	50	20	20	30	30	30	30	50	50	20	20	50	50
Grsp	Grayia spinosa	Spiny hopsage	5	5	10	10	0	0	0	0	10	20	30	30	10	20	20	30	10	10	10	20	10	10	20	20
Gusa	Guitierrezia sarathrae	Broom snakeweed	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	10	0	0	0	0	0	0	0	0
KOCH	Kochia spp.	Green molly	10	10	10	10	10	10	10	0	20	30	50	30	20	30	50	30	0	0	0	0	0	0	0	0
Lepu	Leptodactylon pungens	Prickly phlox	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0	0	0	10	0	0	0	0
OPUN	Opuntia spp.	Prickly pear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pamy	Pachystima myrsinites	Myrtle pachistima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10
Pofr	Potentilla fruiticosa	Bush cinquefoil	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0	0	5	5	5	5	5	5	5	5
Putr	Purshia tridentata	Antelope bitterbrush	30	30	50	50	0	0	0	0	30	30	50	50	30	30	50	50	30	30	50	50	30	30	50	50
RIBE	Ribes spp.	Currant	10	10	10	10	0	0	0	0	10	20	20	10	5	5	5	5	10	20	20	20	10	20	20	20
ROSA	Rosa spp.	Rose	10	10	10	10	10	10	10	10	30	30	50	50	30	30	40	40	50	50	50	50	40	50	50	50
Rhtr	Rhus trilobata	Skunkbush (squawbush)	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	10
SALI	Salix spp.	Willow	0	0	0	0	0	0	0	0	20	20	20	10	5	5	5	5	30	30	40	50	30	30	40	40
Save	Sarcobatus vermiculatus	Greasewood	20	10	10	10	0	0	0	0	0	0	0	0	5	5	5	5	20	20	20	10	10	10	10	10
SHEP	Shepherdia spp.	Buffaloberry	0	0	0	0	0	0	0	0	5	5	5	10	5	5	5	10	5	5	5	10	0	0	0	0
SYMP	Symphoricarpos spp.	Snowberry	20	20	30	10	10	10	10	0	40	40	40	20	30	30	30	20	40	40	40	20	30	30	30	20
TETR	Tetradymia spp.	Horsebrush	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	5	5	5	0	0	0	0
TREES:																										
ABIE	Abies spp.	Fir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	5	5	5
BETU	Betula spp.	Red birch	5	5	5	5	0	0	0	0	20	20	20	20	5	5	5	5	20	20	20	20	30	30	40	40
Juos	Juniperus osteospermia	Utah juniper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	20	20	0	0	0	0
PINU	Pinus spp.	Pine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10
POPU	Populus spp.	Cottonwood	0	0	0	0	0	0	0	0	10	10	10	10	0	0	0	0	20	20	20	20	20	20	30	40
Pofr	Populus fremontii	Fremont cottonwood	0	0	0	0	0	0	0	0	10	10	10	10	0	0	0	0	20	20	20	20	20	20	30	40
Potr	Populus tremuloides	Quaking aspen	0	0	0	0	0	0	0	0	10	10	10	10	0	0	0	0	20	20	20	20	20	20	30	40
PRUN	Prunus spp.	Chokecherry	5	5	5	5	0	0	0	0	5	5	5	5	5	5	5	5	20	20	30	30	20	20	30	30

Source: Rawlins District Office, BLM

APPENDIX B-2-8

Wildlife Condition

The wildlife habitat condition was estimated for pronghorn crucial winter range, pronghorn summer range, mule deer crucial winter range, and sage grouse crucial winter range. The data used to estimate the condition of these ranges was collected from several sources. These include the 1975-1976 weight estimate survey, the 1976 Green Mountain ES survey, the 1972 and 1976 Phase 1 watershed survey (BLM Manual 7313), and the 1976 wildlife habitat inventory. From these sources, the following vegetative information was calculated and analyzed at the range write-up type level (refer to Appendix B-2-7): vegetative species composition (by weight), canopy cover, browse vigor, browse height, and full cover.

Vegetative species composition by weight was computed from the 1975-1976 range survey data (refer to vegetation weight estimate methodology, Appendix B-2-7). The composition of each write-up type was calculated by dividing the weight (dry weight per acre) of each species per write-up type by the total weight of all species per write-up type. This gave the composition by species. The composition by vegetative class (i.e., grass, forb, and browse) was calculated by dividing the total weight of each class by the total weight of the write-up type. This was done for all the survey write-up types in the Seven Lakes.

The canopy cover data were collected driving the range survey. At each clipped plot, an estimate of the browse canopy cover was made. These estimates were periodically checked with a 100-foot tape by recording the percentage of the tape with a browse canopy underneath it. An acreage for the write-up type was computed.

The browse vigor data, south of the Fremont County line were collected at each clipping plot. The three closest browse plants to the welded part of the 9.6-square-foot hoop were sampled. The age class (young, mature, decadent, dead) and form class (slightly hedged, moderately hedged, or severely hedged) were recorded for each of the plants. An average of three plots, or nine browse plants per section were sampled for the ES area. North of the Fremont County line, the vigor data were calculated from the integrated 100-pace transects run in 1976 (refer to the vegetation methodology, Appendix B-2-9).

The average height of the browse was calculated by averaging the height of each of the three browse plants sampled at each plot (nine plants per section). North of the Fremont County line, the data from the pace transects were averaged.

The soil cover data were calculated from the 1972 and 1976 Phase 1 watershed transects. The percent of soil cover was calculated from the percentage of the 100 paces which had either a basal portion of a plant, persistent litter, or nonpersistent litter under the toe point.

In addition to the data collected on the broad range write-up types, vegetation transects were run within the draws and ravines. Each draw was sampled by running several 10- or 20-pace transects across the draw to make up a 100-pace transect for each major draw. From these transects, species composition (by frequency), browse canopy cover, browse vigor, browse height, and soil cover were computed. Thus, for each of the 550 write-up types and the draw vegetation, the species composition (by weight), the average browse canopy cover, the browse vigor, the browse heights and soil cover were calculated. From this information, an estimate of the wildlife habitat condition was made.

Each habitat type (e.g., pronghorn crucial winter, pronghorn summer) was analyzed by giving each range write-up type within those habitats a rating of "good," "fair," or "poor" based on the above data. Criteria were developed for each habitat type to classify the range write-up types. The criteria are listed in Table B-7 and Table B-8. The acreage of those range write-up types in each condition class (e.g., "fair") were added to give a total acreage by condition class. The percent acreage by condition class was then calculated.

Pronghorn
Spring-Summer-Fall,
April 16-November 14

TABLE B-7
BIG GAME HABITAT CONDITION RATING CRITERIA

Condition Class	Vegetative Composition	Browse Canopy Cover	Browse Vigor	Browse Height	Soil Stability	Overall Condition
Good 3 pts.	A & B forbs and grass are more than 60% total composition Browse A & B greater than 20%	greater than 10%	Less than 15% of "A" species severly hedged and decadent minus seedling + young of all species less than 15%	Averages 6-18"	Ground Cover More than 64%	Totals 12 or more with composition and cover rating Good, and vigor, height and soil stability rating at least Fair
Fair 2 pts.	A & B forbs grass 20%-59% A & B browse 5%-20%	3%-9.9%	Less than 35% of "A" species severely hedged and decadent minus seedling + young of all species less than 35%	Averages 18.1-24" or 2"-6"	Ground Cover 35%-63%	Total 9 or more with composition, cover and vigor rating at least Fair
Poor 1 pt.	A & B forbs and grass less than 20% A & B browse less than 5%	Less than 3%	More than 34% of "A" species severely hedged or decadent minus seedling + young of all browse	Averages more than 24" or less than 2"	Ground Cover less than 35%	If Good or Fair requirements are not satisfied

TABLE B-7 (CONTINUED)
BIG GAME HABITAT CONDITION
RATING CRITERIA

Pronghorn and Mule Deer
Winter
November 15-April 15

Condition Class	Vegetative Composition	Browse Canopy Cover	Browse Vigor	Browse Height	Soil Stability	Overall Condition
Good 3 pts.	A & B browse species (must be two or more) make up 75% or more of browse composition with all species at least 30%: and forbs and grass species make up at least 15% of overall composition	greater than 10%	Less than 15% of "A" species severely hedged and decadent minus seedling + young species less than 10%	Averages 6-18"	Ground cover greater than 64%	Totals 12 or more with compostion and cover rating Good and vigor, height and soil stability rating at least Fair
Fair 2 pts	A & B browse species make up 50%-74% of the browse composition with all species 10%-29%; and forb and grass species overall composition	3%-9.9%	Less than 35% of "A" species severely hedged and decadent minus seedling + young species less than 35%	Averges 18.1-24"	Ground cover 35-64%	Totals 9 or more with composition cover and vigor rating at least Fair
Poor 1 pt.	A & B browse species make up less than 50% of the browse composition; or all species less than 10%: or forb or grass species less than 5% by overall composition	less than 3%	More than 34% of "A" species severely hedged, or decadent minus young	Averages more than 24"	Ground cover less than 35%	If Good or Fair requirements are not satisfied

TABLE B-7 (CONTINUED)
BIG GAME HABITAT CONDITION
RATING CRITERIA

Sage Grouse
Nesting
Broad Types and Draws

Condition Class	Vegetative Composition	Browse Canopy Cover	Browse Vigor	Browse Height	Soil Stability	Overall Condition
Good	Artr greater than 60% of browse composition Browse greater than 40% Grass and forbs 40-60%	Greater than 10%	Less than 15% of "A" species severely hedged and decadent minus seedling + young species less than 15%	8-24"	Greater than 64	12 or more points composition, cover, height good, nesting Fair
3 pts.	75% Artr in draws	Greater than 25% in draws				
Fair	Artr from 21% to 59% of browse composition Browse from 15% to 40% Grass and Forbs from 20% to 39% and from 60% to 80%	3-10%	Less than 35% of "A" species severely hedged and decadent minus seedling + young of all species less than 35%	7-24"	35-64	9 or more points composition, cover height - Fair
2 pts.	50-75% Artr in draws		10-25% in draws			
Poor	Artr less than 20% of browse composition Browse less than 15% Grass and Forbs less than 20%, greater 80%	Less than 3%	More than 34% of "A" species severely hedged or decadent minus seedling + young of all species more than 34%	24"	Less than 35	Fair or Good not met
1 pt.						

Sage Grouse
Winter
November 15-April 15

TABLE B-7 (CONTINUED)
BIG GAME HABITAT CONDITION
RATING CRITERIA

Condition Class	Vegetative Composition	Browse Canopy Cover	Browse Vigor	Browse Height	Soil Stability	Overall Condition
Good	Artr greater than 50% browse composition 75% in draws	Greater than 10% on broad types Greater than 25% in the draws	Less than 15% of "A" species severely hedged and decadent minus seedling + young of all species less than 15%	6"-18" broad Greater than 24" on the draws	greater than 64%	greater than 12 pts. total with composition and cover good and height at least Fair
Fair	Artr from 15% to 50% browse composition 50-75% in draws	5%-10% on broad types 10%-25% in the draws	Less than 35% of "A" species severely hedged and decadent minus seeding + young of all species less than 35%	18"-24" 2"-6" 8"-24" in the draws	35%-64%	at least 9 points with composition, height and cover at least Fair
Poor	Artr less than 15% browse	Less than 5% on the broad types Less than 10% in the draws	More than 34% of "A" species severely hedged or decadent types seedling + young of all species more than 34%	Over 28" or less 2" Less than 8" in the draws	Less than 35%	Good and Fair conditions are not met

TABLE B-8
VALUE OF PLANT SPECIES

	Pronghorn			Mule Deer		
	Spring	Summer Fall	Winter	Spring Summer	Fall	Winter
Save	C*	C	C	C	C	C
Atca	A**	A	A	A	A	A
Artr	A	B***	A	B	B	B
Arpe	A	B	A	A	A	A
Arno	A	B	A	B	B	B
Atnu	A	A	A	A	A	A
Chvi	A	B	A	A	A	A
Chla	A	B	B	B	B	B
Chna	A	B	A	B	C	A
Phlox	C	C	C	C	C	C
Agda	B	C	C	B	C	C
Koer	B	C	C	C	B	B
Agsm	B	C	C	B	C	C
Cela	B	C	B	B	C	B
Agsp	A	B	C	A	B	C
Lepu	C	C	C	C	C	C
Orhy	B	B	B	C	B	B
Erlog	B	B	B	B	B	B
Pose	B	B	C	A	A	C
Atco	B	C	A	B	C	B
Sihy	A	B	C	A	B	C
Stco	A	B	C	A	A	C
Arsp	B	B	B	B	B	B
Grsp	C	C	B	C	C	B
Sata	A	B	C	A	C	C
Anten	C	C	C	C	C	C
Aren	C	B	C	B	C	C
Area	A	A	A	A	A	A
Arsf	A	A	A	A	A	A
Sedum	C	C	C	C	C	C

*Undesirable
**Desirable
***Intermediate

APPENDIX B-2-9

RANGE TREND FORM

LOCATION T. N.,R. W., SEC. VEG. TYPE 141 SLOPE 0
PHOTO # EXPOSURE DISTRICT
DATE TRANSECT # CT-1 OBSERVER MS

0 - 1	2 - 3 - 4	5	SCORE
A. 0-20% of desirable plant species reproducing	20 - 80%	80 - 100%	1
B. 0-20% of desirable plant species appear vigorous and healthy	20 - 80%	80 - 100%	3
C. 0-20% of desirable plant species show no overuse	20 - 80%	80 - 100%	4
D. 0-20% of desirable plant species are not decadent or dead	20 - 80%	80 - 100%	4
E. 0-20% of young, desirable species are found in open spaces	20 - 80%	80 - 100%	2
F. 100-80% of undesirable species are reproducing	80 - 20%	20 - 0%	4
G. 100-80% of undesirable species appear vigorous and healthy	80 - 20%	20 - 0%	2
H. 100-80% of undesirables are increasing or invading	80 - 20%	20 - 0%	2
I. 100-80% of undesirables show overuse	80 - 20%	20 - 0%	4
J. 0-20% of undesirables are decadent or dead	20 - 80%	80 - 100%	1
K. Disease, insects, rodents, or other pests are a major problem	...are present and may be a problem	...are insignificant	5
L. Extreme to severe visual evidence of soil movement	Moderate to some.	Slight or no visual evidence of soil movement	2
M. Extreme to severe soil trampling or compaction	Moderate to some..	Slight or no soil trampling or compaction	4

N.	No surface litter is accumulating in place	Some...	surface litter is accumulating in place	
	0-1	2-3-4	5	SCORE
O.	Banks of flow patterns are not stable	...somewhat to moderately stable	...are stable	_____
P.	Most rocks and plants pedestalled, & roots exposed	Moderate to slight pedestalling evident	No visual evidence of pedestalling	_____
Q.	Active wind-caused erosion is occurring to a large degree	Moderate to slight active water erosion is occurring	No signs of active water erosion	_____
S.	Bare areas appear to be increasing	Bare areas exhibit stability	Bare areas are becoming vegetated	_____
T.	Drought, flood, or other unusual problem on site	Site may be subject to occasional flood or similar problem	No unusual problems apparent	_____
			TOTAL POINTS	_____
			RATING	_____

Rating

0- 33 Total Points	Downward
34- 67 Total Points	Stable
68-100 Total Points	Upward

APPENDIX B-2-10

Range Condition

Criteria

SCS range site and condition criteria are based on an objective ecological approach. To maintain this approach, the following points must be recognized:

(a) Each species of a climax plant community has its ecological niche and inherent functions in that community.

(b) Range sites are differentiated on the basis of significant differences in kind, proportion, or amount of plant species in the plant community, regardless of their value for any specific purpose.

(c) Range condition is determined by comparing existing plant communities with the presumed climax plant community for a specific range site, regardless of the value of individual plants or the plant community of various uses.

(d) Departures from climax, which can result from many causes, can enhance or depreciate the value of the resultant plant community for various uses.

(e) Determining range site and range condition does not automatically establish grazing value. Grazing values of range sites and range condition classes must be established for management units by evaluating the results of actual grazing use.

(f) If grazing of the climax plant community on a specific range site is constantly subjected to moderately heavy use, the response of individual plant species depends on the kind of grazing animal and the season of use. A species that decreases if a range is grazed by cattle in spring may increase if the range is grazed by deer or by sheep.

(g) An abnormal amount of any species, compared with the amount in the climax, represents a change in range condition, regardless of the value of the species for any specific use.

Definition of Range Condition

Range condition is the present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site. Range condition is basically an ecological rating of the plant community. Air-dry weight is the unit of measure used in comparing the composition and production of the present plant community with that of the climax community.

Purpose of Determining Range Condition

The primary purpose of determining range condition is to provide a basis for predicting the extent and direction of changes that can result in the plant community because of specific treatment or management. The range site indicates the potential; range condition represents a starting point for management toward the potential or toward the objective selected by the decision maker.

Guide for Rating Range Condition

A guide for rating range condition is required for each range site. This guide can be prepared separately or the information can be included in the part of the range site description that lists the major plant species.

The guide should list the common species in the climax plant community for the site and the amount of each species considered characteristic for the site. The amount of each species can be expressed in pounds per acre (lbs/acre) or as a percentage of total production of the plant community. Guides that indicate both production in air-dry weight and percentage of composition of individual plant species are more versatile than guides that show only one quantitative value. Range condition guides should bear the date of preparation or the most recent date of revision.

Determining Range Condition

The range condition of areas within a range site is determined by comparing the present plant community with that of the climax plant community, as indicated by the range condition guide for the site.

For the existing plant community, count as climax no more than the maximum weight (or percentage of total production) shown on the guide for any species in the climax plant community (Table B-5 and Table B-6).

The amount of all climax species not in excess of that shown on the guide is totaled to indicate the relative ecological rating or numerical evaluation of the stand. The rating will be between 0 and 100, depending on how closely the plant community resembles the climax plant community for the range site.

(a) Range condition class. Four classes are used to express the degree to which the composition of the present plant community reflects that of the climax. They are shown in Table B-9.

Guides based on the weight of species in the climax plant community give a true expression of ecological condition. A condition rating based on the percentage of composition alone may need adjustment if the total production is less than that characteristic for the condition class. For example, a rating determined by counting the percentage of each climax species may indicate that the existing plant community is in near-climax condition, but the production of these species is less than that expected for near-climax condition. The condition rating should therefore be lowered, giving due consideration to the current growing conditions.

Example:

To determine the range condition for vegetation type TB-32 which is located in soil mapping unit 301, the Green River and Great Divide Basin 7"-9" precipitation zone (Table B-6) must be used. From Table B-4, located in Appendix B-2-2, the range site located in soil mapping unit 301 is saline upland (SU). The vegetative species for vegetative type TB-32 can be obtained from the Seven Lakes Range Survey. The species and the percentage each species contributes to the overall composition of TB-32 are listed on Form 2-a.

The vegetative species found to be decreasers on Table B-6 represent a part of the original vegetation and its entire percentage counts toward the possible 100 percent coverage of climax vegetation.

Vegetative species which are found to be increasers can contribute only the allowable percentage of that species found in the original vegetation. To determine the allowable percentage, Table B-6 must be used. For example, on Table B-6, greasewood (*Sarcobatus vermiculatus*) is an increaser in the saline upland range site. By following the greasewood row across until the saline upland (SU) range site column is reached, a percentage is found. This 5 percent represents the allowable percentage of greasewood found in the original vegetation on the saline upland range site. Five percent is listed on Form 2-a under the saline upland range site increaser column. This procedure is followed for each vegetative species. Each decreaser and increaser column for each range site must be totaled and added together. The percentage the range site contributes to the soil mapping unit must be multiplied by the sum of increaser and decreaser columns. Using the TB-32 vegetation type example, saline uplands contribute 100 percent to soil mapping unit 301. Therefore, 1.00 times 49 equals 49 percent. This is done for each range site and the results are summed. Summation of the results in the example is 49 percent.

To properly determine the range condition for each vegetative type, species composition and vegetative production must be considered. The method just discussed takes into account the species composition only. Analysis of the species composition portion could result in a range condition class which would be higher than the actual range condition.

In the range site description an average annual production for each range site in excellent condition is listed (Appendix B-2-3). For example, the average annual production for the saline upland range site is 450 pounds per acre. To determine the average annual production for the soil mapping unit, the percentage the range site contributes to the soil mapping unit must be multiplied by the average annual production for the range site. For example in the saline upland, 100% x 450 pounds per acre equals 450 pounds per acre. The total production of the vegetative type (obtained from the vegetative survey) divided by the average annual production of the soil mapping unit would result in a percentage. In the example involving the vegetative type TB-32 and the soil mapping unit 301, this percentage would be 52 (233 pounds per acre divided by 450 pounds per acre).

To calculate the percentage of the present plant community that is climax for the soil mapping unit, it is necessary to add the species composition percentage (previously calculated) and the production percentage (just calculated) and then dividing by two. In the example being discussed, 49 percent (species composition percentage) plus 52 percent (production percentage) equals 101 percent which is divided by two equalling 50 percent. The 50 percent represents the percentage of the present plant community that is in climax for this particular soil mapping unit. Therefore, vegetation type TB-32 would be in fair condition.

TABLE B-9

RANGE CONDITION CLASS BY COMPARISON OF PRESENT PLANT COMMUNITY TO CLIMAX

Range condition class	Percentage of present plant community that is climax for the range site
Excellent	76-100
Good	51-75
Fair	26-50
Poor	0-25

FORM 2-a
RANGE CONDITION
(SCS METHOD)

7"-9" Precipitation Zone

TB-32
301

SPECIES		SU-95%		RANGE SITES/% MAPPING UNIT					
NAME	%	D	I	D	I	D	I	D	I
Sihy	1	1	1						
Agda	36	36							
Orhy	17								
Dist	5								
Eriog	1		1						
Atnu	6	6							
Koam	1		--						
Chvi	1		--						
Arsp	0	--	--						
Save	31		5						
Artr	0	--	--						
Arfr	0	--	--						
TOTAL	99	43	6						
TOTAL D&I		49							

Total D&I 49 x 1.0% Mapping Unit = 49
Total D&I __ x __% ____ = __
Total D&I __ x __% ____ = __
Total D&I __ x __% ____ = __
AVERAGE = 49

Total Prod (A) = 233
SCS Average Prod (B) = 450

$\frac{A}{B} \times 100 = 52\%$

(49 + 52) ÷ 2 = 50% FAIR

APPENDIX B-2-11

Nongame, Smallgame Wildlife Observed in the ES Area

Mammals

- Coyote
- Badger
- White-tailed Prairie Dog
- Richardson's Ground Squirrel
- Thirteen-lined Ground Squirrel
- Short-tailed Weasel
- Cottontail Rabbit
- White-tailed Jackrabbit
- Least Chipmunk
- Muskrat

Birds

- Golden Eagle
- Ferruginous Hawk
- Prairie Falcon
- Swainson's Hawk
- Marsh Hawk
- Kestrel
- Short-eared Owl
- Burrowing Owl
- Great Horned Owl
- Screech Owl
- Turkey Vulture
- Lark Bunting
- Vesper Sparrow
- Loggerheaded Shrike
- Brewer's Sparrow
- Brewer's Blackbird
- Chipping Sparrow
- Clark's Nutcracker
- Lark Sparrow
- Rough-legged Hawk
- Greater Nighthawk
- Red-tailed Hawk

APPENDIX B-2-12

Representative Wildlife of the Seven Lakes ES Area

Wildlife Species By Habitat

1. Shrub-steppe, Grassland
   - *Mammals*
     - Merriam Shrew
     - Richardson's Ground Squirrel
     - Thirteen-lined Ground Squirrel
     - White-tailed Prairie Dog
     - Olive-backed Pocket Mouse
     - Ord's Kangaroo Rat
     - Northern Grasshopper Mouse
     - Sagebrush Vole
     - Black-footed Ferret
     - Pronghorn
   - *Birds*
     - Burrowing Owl MB*
     - Say's Phoebe
     - Sage Thrasher MB
     - Lark Bunting MB
     - Vesper Sparrow MB
     - Sage Sparrow MB
     - Brewer's Sparrow MB
     - Prairie Falcon YR**
     - Horned Lark YR
     - Loggerheaded Shrike MB
     - Western Meadowlark YR
     - Northern Shrike MB
     - Sage Grouse YR
   - *Reptiles*
     - Sagebrush Lizard
     - Prairie Lizard
     - Eastern Short-horned Lizard
     - Yellow-bellied Racer
2. Mountain Shrub
   - *Mammals-Nongame*
     - Bushy-tailed Woodrat
     - Striped Skunk
     - Small-footed Myotis
     - Yellow-bellied Marmot
     - Golden-mantled Ground Squirrel
   - *Birds*
     - Common Flicker
     - Yellow-bellied Sapsucker YR
     - Brown Thrasher MB
     - Western Bluebird MB
     - Mountain Bluebird
     - White-crowned Sparrow MB
     - Canyon Wren MB
     - Rock Wren MB
     - Violet-green Swallow MB
     - Mountain Chickadee YR
     - Short-eared Owl YR
     - Great Horned Owl YR
   - *Reptiles*
     - Sagebrush Lizard
3. Riparian—Water
   - *Mammals*
     - Beaver
     - Meadow Vole
     - Water Shrew
   - *Birds*
     - Eared Greebe MB
     - Kildeer MB
     - Spotted Sandpiper MB
     - American Avocet MB
     - Wilsons Phalarope MB
     - Black Tern MB
     - Belted Kingfisher MB
     - Mallard MB
     - Pintail MB
     - Gadwall MB
     - Green-wing Teal MB
     - Baldpate MB
     - Yellow Flycatcher MB
     - Yellow Warbler MB

4. Shrub-steppe, Grassland, Mountain Shrub, Riparian
   Mammals
      Long-eared Myotis
      Desert Cottontail
      White-tailed Jackrabbit
      Least Chipmunk
      Northern Pocket Gopher
      Deer Mouse
      Longtail Vole
      Coyote
      Red Fox
      Long-tailed Weasel
      Badger
      Striped Skunk
      Bobcat
      Mule Deer
   Birds
      Turkey Vulture MB
      Swainson's Hawk MB
      Ferruginous Hawk MB
      Red-tailed Hawk MB
      Peregrine Falcon MB
      Merlin MB
      American Kestrel MB
      Mountain Plover MB
      Common Nighthawk MB
      Golden Eagle YR
      Rough-legged Hawk MW***
   Reptiles and Amphibians
      Prairie Rattlesnake
      Bullsnake
      Common Garter Snake
      Basin Spadefoot

*MB—migrant, breeding in Wyoming
**YR—yearlong resident
***MW—migrant winter
Source: Wyoming Game and Fish 1977a, and U.S.D.I., BLM 1976b.

APPENDIX B-2-13

Aquatic Habitat Evaluation Procedures

Aquatic habitat quality in streams is a function of channel stability. A channel with good stability will have normal amounts of cutting, movement and deposition in balance with the cumulative effects of hydrological parameters within the watershed. Channel stability, therefore, is a function of gradient, substrate, flow volume, duration and variations, bank composition and stability, vegetative cover and external factors such as debris, additions of sediment and external influences in flow volume and duration. The stream habitat inventory conducted on Crooks Creek (only stream in the ES area that contains a fishery) utilized Bureau of Land Management "Techniques for Conducting Stream Habitat Survey on National Resource Land" to quantitatively determine physical habitat features (refer to Figure B-1 for specific criteria). The information presented herein represents the compilation and analysis of data sampling of fish populations of T.28N., R.92W. Section 31 by the Wyoming Game and Fish Department (based on a 500 foot electrofishing station) which produced 106 brook trout per mile (personal communication Chuck Viox).

FIGURE B-1
STREAM CHANNEL STABILITY FIELD EVALUATION FORM

Items Rated	Stability Indicators by Classes							
UPPER BANKS	EXCELLENT		GOOD		FAIR		POOR	
Landform Slope	Bank slope gradient <30%	2	Bank slope gradient 30%-40%	4	Bank slope gradient 40%-60%	6	Bank slope gradient 60%+	8
Mass Wasting Existing or Potential	No evidence of past or potential for future mass wasting into channels.	3	Infrequent and/or very small. Mostly healed over. Low future potential.	6	Moderate frequency & size, with some raw spots eroded by water during high flows.	9	Frequent or large, causing sediment nearly yearlong or imminent danger of same.	12
Debris Jam Potential Floatable Objects	Essentially absent from immediate channel area.	2	Present but mostly small twigs and limbs.	4	Present, volume and size are both increasing.	6	Moderate to heavy amounts, predominantly larger sizes.	8
Bank Protection from Vegetation	90%+ plant density. Vigor and variety suggests a deep, dense root mass.	3	70%-90% density. Fewer plant species or lower vigor suggests a less dense or deep root mass.	6	50%-70% density. Lower vigor & still fewer species form a somewhat shallow & discontinuous root mass.	9	<50% density plus fewer species & less vigor indicate poor, discontinuous, & shallow root mass.	12
LOWER BANKS								
Channel Capacity	Ample for present plus some increases. Peak flows contained. W/D ratio <7.	1	Adequate. Overbank flows rare. Width to Depth (W/D) ratio 8-15.	2	Barely contains present peaks. Occasional overbank floods. W/D ratio 15-25.	3	Inadequate. Overbank flows common. W/D ratio 25.	
Bank Rock Content	65%+ with large, angular boulders 12"+ numerous	2	40%-65%, mostly small boulders to cobble 6"-12".	4	20%-40%, with most in the 3"-6" diameter class.	6	<20% rock fragments of gravel sizes, 1"-3" or less.	8
Obstructions Flow Deflectors Sediment Traps	Rocks, old logs firmly embedded. Flow pattern of pool & riffles stable without cutting or deposition.	2	Some present, causing erosive cross currents & minor pool filling. Obstructions & deflectors newer less firm.	4	Moderately frequent, moderately unstable obstructions & deflectors move with high water causing bank cutting & filling of pools.	6	Frequent obstructions & deflectors cause bank erosion yearlong. Sediment traps full, channel migration occurring.	8
Cutting	Little or none evident. Infrequent raw banks less than 6" high generally.	4	Some, intermittently at outcurves & constrictions. Raw banks may be up to 12".	8	Significant. Cuts 12"-14" high. Root mat overhangs & sloughing evident.	12	Almost continuous cuts, some over 24" high. Failure of overhangs frequent.	16

FIGURE B-1 (CONTINUED)
STREAM CHANNEL STABILITY FIELD EVALUATION FORM

Items Rated	Stability Indicators by Classes							
LOWER BANKS	EXCELLENT		GOOD		FAIR		POOR	
Deposition	Little or no enlargement of channel or point bars.	4	Some new increases in bar formation, mostly from coarse gravels.	8	Moderate deposition of new gravel & coarse sand on old & some new bars.	12	Extensive deposits of predominately fine particles. Accelerated bar development.	16
BOTTOM								
Rock Angularity	Sharp edges and corners, plane surfaces roughened.	1	Round corners & edges, surfaces smooth & flat.	2	Corners & edges well rounded in two dimensions.	3	Well rounded in all dimensions, surfaces smooth.	4
Brightness	Surfaces dull, darkened, or stained. Gen. not "bright"	1	Mostly dull but may have up to 35% bright surfaces.	2	Mixture, 50%-50% dull & bright, +15%; i.e., 35%-65%	3	Predominately bright, 65%+ exposed or scoured surfaces	4
Consolidation or Particle Packing	Assorted sizes tightly packed and/or overlapping.	2	Moderately packed with some overlapping	4	Mostly a loose assortment with no apparent overlap.	6	No packing evident. Loss assortment, easily moved.	8
Bottom Size Distribution	No change in sizes evident.		Distribution shift slight.		Moderate change in sizes.		Marked distribution change.	
Percent Stable Material	Stable materials 80%-100%	4	Stable materials 50%-80%	8	Stable materials 20%-50%	12	Stable materials 0%-20%	16
Scouring & Deposition	Less than 5% of the bottom affected by scouring & deposition.	6	5%-30% affected. Scour at constrictions & where grades steepen. Some deposition in pools.	12	30%-50% affected. Deposits & scour at obstructions, constrictions, & bends. Some filling of pools.	18	More than 50% of the bottom in a state of flux or change nearly yearlong.	24
Clinging Aquatic Vegetation Moss & Algae	Abundant. Growth largely moss like, dark green, perennial. In swift water too.	1	Common. Algal forms in low velocity & pool areas. Moss here too and swifter waters.	2	Present but spotty, mostly in backwater areas. Seasonal blooms make rocks slick.	3	Perennial types scarce or absent. Yellow-green, short term bloom may be present.	4
	COLUMN TOTALS							

FIGURE B-1 (CONTINUED)
STREAM CHANNEL STABILITY FIELD EVALUATION FORM

Record the values in each column for a total reach score. (E.___ + G.___ + F.___ _ P.___ = ___)

Reach score of: 38 = Excellent, 39-76 = Good, 77-114 = Fair, 115+ = Poor.

Circle only one of the numbers in parenthesis for each indicator rated. If condition falls between the conditions described, cross out the given number and write in the intermediate value. The above Form is to be completed each time Form 6671-2 is completed (see Part II, Recording Field Data). The above Form was developed by Hydrologists in the Northern Region of the United States Forest Service.

Duff, D. A. and J. Cooper. 1976. Techniques for conducting stream habitat surveys on national resource lands.

APPENDIX B-2-14

Methodology Used in Determining Future Key Species Composition

Olsen and Hansen (1977) have shown the annual average percentage of major plants in the diets of large ungulates on the Red Desert of Wyoming during 1974 and 1975 (Table B-10).

Grazing continuously yearlong on the vegetative species which contributes significantly to the diet of the large ungulates would, over the long-term period, lead to a decrease in the percentage that species contributes to the vegetation composition. Key species which would decrease in composition would be wheatgrass (*Agropyron* spp.), sagebrush (*Artemisia* spp.), and needlegrass (*Stipa* spp.). The larger the amount the species contributes to the diet, the larger the decrease.

TABLE B-10

PERCENTAGE SEASON DIET OVERLAPS OF FOUR UNGULATES ON THE RED DESERT OF WYOMING DURING 1974 AND 1975

Category of food	Horses	Cattle	Sheep	Antelope
Wheatgrass (*Agropyron* spp.)	37	54	14	< 1
Needlegrass (*Stipa* spp.)	36	11	22	1
Sagebrush (*Artemisia* spp.)	< 1	1	3	78
Antelope bitterbrush (*Purshia tridentata*)		< 1	1	1
Saltbush (*Atriplex* spp.)	2	9	47	6
Indian ricegrass (*Oryzopsis hymenoides*)	10	9	1	< 1
Sedges (*Carex* spp.)	5	4	1	< 1
Common winterfat (*Eurotia lanata*)	3	5	2	< 1
Russianthistle (*Salsola kali*)	< 1		< 1	5
Black greasewood (*Sarcobatus vermiculatus*)	< 1		5	1
Brome (*Bromus* spp.)	2	1	1	< 1
Vetches (*Astragalus* and *Oxytropis*)		< 1		2
Elaeagnus (*Elaeagnus commutata*)				2
Sixweeksgrass (*Vulpia* spp.)	< 1	2	1	
Snowberry (*Symphoricarpos* spp.)	1	< 1	< 1	
Bluegrass (*Poa* spp.)	1	1	1	< 1
Dropseed (*Sporobolus* spp.)	< 1		< 1	
Bladderpod (*Lesquerella* spp.)		< 1		
Rubber rabbitbrush (*Chrysothamnus nauseosus*)	1	< 1	< 1	1
Rose (*Rosa* spp.)				< 1
Globemallow (*Sphaeralcea* spp.)	1		< 1	
Cryptantha (*Cryptantha* spp.)		1		< 1
Inland saltgrass (*Distichlis* stricta)	< 1	1	< 1	

APPENDIX B-2-15

Explanation of Current Level of Livestock Use

The present Seven Lakes incommon allotment encompasses an area considerably larger than the Seven Lakes ES area. From it, the proposed Cyclone Rim and Stewart Creek, as well as a third allotment—the Arapahoe Creek—which lies north of the ES area, would be drawn. Because livestock are currently licensed to use the entire Seven Lakes incommon allotment and are not restricted to the portions of it which correspond to the proposed allotments, an assumption as to where the livestock use is currently taken was made by range conservationists of the Divide Resource Area.

That assumption is as follows:

The breakdown of the use would be:

1. *Proposed Allotment* *Percent Use*

	Summer *Cattle*	Winter *Sheep*	Summer *Sheep*
Cyclone Rim	30	90	40
Arapahoe Creek	60	0	60
Stewart Creek	10	10	0

2. Unauthorized cattle drift into the Seven Lakes incommon allotment currently adds 30% more use (3,077 AUMs) annually to the total authorized use of 10,256 cattle AUMs. Of the 3,077 AUMs, 1,231 would be found in the ES area according to part 1 above (i.e., 40% of 3,077).

3. Average active authorized livestock use was calculated over the 5 years (1972-1976) from Table 1-1. The average was added to the 1,231 cattle AUMs found in part 2. Within that portion of the Seven Lakes incommon allotment within the ES area the present average active use is 4,460 cattle AUMs, 16,263 winter sheep AUMs, and 1,838 summer sheep AUMs. The Ferris allotment average active use is 209 cattle AUMs and 3,335 winter sheep AUMs with no summer sheep.

APPENDIX B-2-16

Apparent Trend of Pronghorn Habitat

The apparent trend of pronghorn habitat was based on present soil and plant conditions. Vegetative age class and soil stability were used as rating criteria. Thirty-six sites were selected for rating; 35 were in the ES area. Points were given for each criteria, with the overall point total indicating the apparent trend (see Table B-11). The total possible was 24 points. Less than 10 points indicated a downward trend, 10 to 17 was stable, and greater than 17 points was improving. The rating of desirable versus undesirable is the same as for habitat conditions.

TABLE B-11
APPARENT TREND RATING CRITERIA FOR PRONGHORN HABITAT

	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
Vegetative Age Class	Desirable* vegetation is abundant in seedling and mature stages.	Desirable vegetation is present in mature stages. Some desirable seedlings and/or decadent individuals may be present.	Desirable vegetation is absent or present only in decadent or seedling stages.
	9 8 7	6 5 4	3 2 1
Soil	Little soil movement, Few plants pedestaled Good litter or soil cover	Moderate soil movement 15% - 35% plants pedestaled Fair soil cover	Much soil movement Over 35% plants pedestaled Evidence of gully erosion Poor soil cover

Remarks: e.g., Browse cover estimate_____ Vigor _____ Composition _____ G _____ F _____ Shrubs _____

*Same as for habitat condition in Appendix B-2-8.

APPENDIX B-2-17

SCIENTIFIC AND COMMON NAMES OF PLANTS

Scientific names		Common names
	Grasses	
Poa secunda		Sandberg bluegrass
Agropyron dasystachyum		Thickspike wheatgrass
Agropyron spicatum		Bluebunch wheatgrass
Oryzopsis hymenoides		Indian ricegrass
Stipa comata		Needle-and-thread
Sitanion hystrix		Bottlebrush squirreltail
Agropyron smithii		Western wheatgrass
Koeleria cristata		Prairie junegrass
Poa pratensis		Kentucky bluegrass
	Forbs	
Phlox spp.		Phlox
Eriogonum spp.		Wild buckwheat
Orthocarpus luteus		Yellow owlclover
Haplopappus acaulis		Stemless goldenweed
Achillea lanulosa		Western yarrow
	Shrubs	
Artemisia tridentata		Big sagebrush
Artiplex nuttallii		Nuttall saltbush
Sarcobatus vermiculatus		Greasewood
Chrysothamnus viscidiflorus		Douglas rabbitbrush
Chrysothamnus nauseosus		Rubber rabbitbrush
Artemisia spinescens		Bud sagewort
Artemisia pedatifida		Birdfoot sagewort
Atriplex confertifolia		Shadscale saltbush
Ceratoides lanata		Winter-fat
Artemisia frigida		Fringe sagebrush
Purshia tridentata		Antelope bitterbrush
Artemisia nova		Black sagebrush

APPENDIX B-2-18

Sediment Yield Factor Rating

In the Pacific Southwest Interagency Committee (PSIAC) method of estimating sediment yields, nine factors are considered in determining the sediment yield rating (see attached form). The sediment yield characteristic of each factor is assigned a numerical value representing its relative significance in the yield rating. The sediment yield rating is the sum of values for the appropriate characteristics for each of the nine factors. Conversion of the numerical rating to sediment yield is made using a graph (see BLM form 7310-16).

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SEDIMENT YIELD FACTOR RATING

	SURFACE GEOLOGY (a)	SOILS (b)	CLIMATE (c)	RUNOFF (d)	TOPOGRAPHY (e)
	(10) a. Marine shales and related mudstones and siltstones	(10) a. Fine textured; easily dispersed; saline-alkaline; high shrink-swell characteristics b. Single grain silts and fine sands	(10) a. Storms of several days' duration with short periods of intense rainfall b. Frequent intense convective storms c. Freeze-thaw occurrence	(10) a. High peak flows per unit area b. Large volume of flow per unit area	(20) a. Steep upland slopes (in excess of 30%) b. High relief, little or no floodplain development
	(5) a. Rocks of medium hardness b. Moderately weathered c. Moderately fractured	(5) a. Medium textured soil b. Occasional rock fragments c. Caliche layers	(5) a. Storms of moderate duration and intensity b. Infrequent convective storms	(5) a. Moderate peak flows per unit area b. Moderate volume of flow per unit area	(10) a. Moderate upland slopes (less than 20%) b. Moderate fan or floodplain development
	(0) a. Massive, hard formations	(0) a. High percentage of rock fragments b. Aggregated clays c. High in organic matter	(0) a. Humid climate with rainfall of low intensity b. Precipitation in form of snow c. Arid climate, low intensity storms d. Arid climate; rare convective storms	(0) a. Low peak flows per unit area b. Low volume of runoff per unit area c. Rare runoff events	(0) a. Gentle upland slopes (less than 5%) b. Extensive alluvial plains
Factor value					

	GROUND COVER (f)	LAND USE (g)	UPLAND EROSION (h)	CHANNEL EROSION AND SEDIMENT TRANSPORT (i)
	(10) Ground cover does not exceed 20% a. Vegetation sparse; little or no litter b. No rock in surface soil	(10) a. More than 50% cultivated b. Almost all of area intensively grazed c. All of area recently burned	(25) a. More than 50% of the area characterized by rill and gully or landslide erosion	(25) a. Eroding banks continuously or at frequent intervals with large depths and long flow duration b. Active headcuts and degradation in tributary channels
	(0) Cover not exceeding 40% a. Noticeable litter b. If trees present understory not well developed	(0) a. Less than 25% cultivated b. 50% or less recently logged c. Less than 50% intensively grazed d. Ordinary road and other construction	(10) a. About 25% of the area characterized by rill and gully or landslide erosion b. Wind erosion with deposition in stream channels	(10) a. Moderate flow depths, medium flow duration with occasionally eroding banks or bed
	(–10) a. Area completely protected by vegetation, rock fragments, litter b. Little opportunity for rainfall to reach erodible material	(–10) a. No cultivation b. No recent logging c. Low intensity grazing	(0) a. No apparent signs of erosion	(0) a. Wide shallow channels with flat gradients and short flow duration b. Channels in massive rock, large boulders, or well vegetated c. Artificially controlled channels
Factor value				

	Subtotal (a) – (g)	Subtotal (h) – (i)	TOTAL RATING – – – = – – . – ac.ft./sq. mi./yr.

(Instructions on reverse)

Form 7310–16 (July 1971)

APPENDIX B-2-19

RANGE TRANSECTS IN ES AREA

Stable

CT-1*
CT-2
CT-3
CT-4*
CT-5
CT-7*
CT-8
CT-11
CT-12
CT-13*
CT-14
CT-15
CT-16*
CT-17
CT-18
CT-19*
CT-20
CT-21
CT-22
CT-24
CT-25*
CT-26
CT-27
CT-31
CT-32*
CT-40
CT-41
CT-42
CT-43
CT-44
CT-45
CT-46*
CT-47
CT-49
CT-52
CT-53
CT-54
CT-55*
CT-56
CT-57
CT-58

Upward

CT-6
CT-9
CT-10
CT-48

Downward

CT-50*

*Established as a permanent transect.

APPENDIX B-2-20

SOIL MAPPING UNITS IN THE SEVEN LAKES ES AREA

Map Unit Number	Mapping Unit Classification*		Estimated % of Map Unit	Common Name	Total Acres
	Subgroup**	Family***			
202	Borollic Haplargids	fine-loamy, mixed	60	Stony Alluvial Fans	3,436
	Borollic Haplargids	fine-loamy, mixed	20		
	Stony Land	-----------------	20		
204	Ustic Torriorthents	loamy, mixed, calcareous, frigid, shallow	40	Shallow and Moderately-deep soil association	7,034
	Borollic Haplargids	fine-loamy, mixed	30		
	Ustic Torriorthents	loamy, mixed, calcareous, frigid, shallow	15		
	Ustic Torriorthents	loamy, mixed, calcareous, frigid, shallow	15		
205	Stoney Outwash Soils	-----------------	80	Stony Alluvium on moderately steep slopes	2,050
	Borollic Haplargids	fine-loamy, mixed	10		
	Rock Outcrop	-----------------	5		
	Lithic Torriorthents	coarse-loamy, mixed	5		
206	Ustic Torriorthents	loamy-skeletal, mixed, calcareous, frigid, shallow	50	Gravelly Alluvium on steep hillsides	2,318
	Ustic Torriorthents	loamy-skeletal, mixed, calcareous, frigid, shallow	30		
	Stony land	-----------------	15		
	Rock Outcrop	-----------------	5		
207	Borollic Haplargids	coarse-loamy, mixed	30	Rolling Benchland	6,753
	Borollic Haplargids	fine-loamy, mixed	40		
	Ustic Torriorthents	loamy, mixed, calcareous, frigid, shallow	15		
	Borollic Haplargids	fine-loamy, mixed	15		
208	Borollic Haplargids	coarse-loamy, mixed	50	Rolling Benchland	4,732
	Borollic Haplargids	coarse-loamy, mixed	30		
	Borollic Haplargids	fine-loamy, mixed	10		
	Ustic Torriopsamments	mixed, frigid	10		

Map Unit Number	Mapping Unit Classification*		Estimated % of Map Unit	Common Name	Total Acres
	Subgroup**	Family***			
209	Ustic Torriopsamments	mixed, frigid	60	Sand Dune	3,506
	Ustic Torriopsamments	mixed, frigid, shallow	20		
	Ustic Torriopsamments	mixed, frigid	10		
	Ustic Torriopsamments	coarse-loamy, mixed	5		
	Lithic Ustic Torriopsamments	mixed, frigid, shallow	5		
214	Saline and Alkaline Soils		100	Saline and Alkaline Soils	344
301	Typic Natrargids	fine, montmorilonitic, frigid	50	Alluvial Fans and narrow flood plains	73,175
	Typic Torrifluvents	fine-loamy, mixed, calcareous, frigid	30		
	Typic Torriopsamments	mixed, calcareous, frigid	10		
	Typic Torriothents	fine-loamy, mixed, calcareous, frigid,	5		
	Typic Salorthids	fine-loamy, mixed, frigid	5		
302	Typic Torriorthents	loamy, mixed, calcareous, frigid, shallow	50	Steep ridges and hillsides	4,566
	Lithic Torriorthents	fine, montmomillonitic, frigid	20		
	Typic Torriorthents	fine-loamy, mixed calcareous, frigid	5		
	Rock Outcrop	------------------	25		
303	Typic Torriorthents	fine-loamy, mixed, calcareous, frigid	45	Gently sloping Alluvial Fans	14,973
	Typic Torriorthents	fine-loamy, mixed calcareous, frigid	35		
	Typic Torriorthents	fine-loamy, mixed calcareous, frigid shallow	10		
	Typic Natrargids	fine-loamy, mixed, calcareous, frigid	10		

Map Unit Number	Mapping Unit Classification*		Estimated % of Map Unit	Common Name	Total Acres
	Subgroup**	Family***			
304	Typic Torriorthents	loamy, mixed, calcareous, frigid shallow	30	Rolling Uplands	2,409
	Typic Haplargids	fine-loamy, mixed, calcareous, frigid	30		
	Typic Torriorthents	fine-loamy, mixed, calcareous, frigid	20		
	Typic Torriorthents	fine-loamy, mixed calcareous, frigid	10		
	Typic Torriorthents	fine-loamy, mixed, calcareous, frigid	10		
305	Typic Haplargids	fine-loamy, mixed, calcareous, frigid	50	Moderately deep nearly level Alluvial Fans	88,655
	Typic Haplargids	fine-loamy, mixed calcareous, frigid	30		
	Typic Torriorthents	fine-loamy, mixed, calcareous, frigid	10		
	Lithic Torriorthents	loamy, mixed, calcareous, frigid, shallow	10		
306	Typic Torriorthents	loamy, mixed calcareous, frigid shallow	50	Upland ridges and hillsides	40,170
	Typic Torriorthents	fine-loamy, mixed, calcareous, frigid	30		
	Typic Torriorthents	fine-loamy, mixed calcareous, frigid	10		
	Typic Torriorthents	loamy, mixed, calcareous, frigid, shallow	5		
	Rock Outcrop	-----------------	5		
307	Typic Haplargids	fine-loamy, mixed, calcareous, frigid	60	Deep, nearly level Alluvial Fans	49,673
	Typic Haplargids	fine-loamy, mixed, calcareous, frigid	20		
	Typic Haplargids	coarse-loamy, mixed, calcareous, frigid	15		
	Typic Natrargids	fine-loamy, mixed, calcareous, frigid	5		

Map Unit Number	Mapping Unit Classification*		Estimated % of Map Unit	Common Name	Total Acres
	Subgroup**	Family***			
308	Typic Haplargids	fine-loamy, mixed, calcareous, frigid	50	Shallow and moderately deep Alluvial Fans	44,703
	Typic Haplargids	loamy, mixed, calcareous, frigid, shallow	35		
	Typic Torriorthents	loamy, mixed, calcareous, frigid, shallow	10		
	Typic Torriorthents	fine-loamy, mixed, calcareous, frigid	5		
310	Typic Natrargids	fine-loamy, mixed, calcareous, frigid	60	Saline rolling uplands	47,565
	Typic Haplargids	fine-loamy, mixed, calcareous, frigid	20		
	Typic Haplargids	coarse-loamy, mixed, calcareous, frigid	10		
	Typic Torriorthents	loamy, mixed, calcareous, frigid, shallow	10		
311	Typic Natrargids	loamy, mixed, frigid, shallow	50	Saline rolling uplands and ridges	10,742
	Typic Torriorthents	loamy, mixed calcareous, frigid, shallow	30		
	Typic Torriorthents	fine-loamy, mixed, calcareous, frigid	10		
	Typic Natrargids	fine-loamy, mixed	10		
312	Typic Torriorthents	loamy, mixed, frigid	80	Shallow soils on ridges and steep hillsides	23,025
	Typic Torriorthents	loamy-skeletal, mixed, calcareous, frigid, shallow	15		
	Rock Outcrop	------------------	5		
313	Typic Torriorthents	loamy-skeletal, mixed, frigid	60	Steep, stony lands	3,582
	Typic Haplargids	loamy-skeletal, mixed, calcareous frigid	20		
	Stony Land	-----------------	20		

Map Unit Number	Mapping Unit Classification*		Estimated % of Map Unit	Common Name	Total Acres
	Subgroup**	Family***			
314	Typic Torriorthents	loamy-skeletal, mixed, frigid	40	Stony terraces	3,274
	Typic Haplargids	loamy-skeletal, mixed, frigid	35		
	Stony Land	---------------	15		
	Typic Torriorthents	loamy-skeltal, mixed, frigid, shallow	10		
316	Typic Torriorthents	fine, montmorillonitic, calcareous, frigid	40	Saline rolling uplands and sidehills	13,445
	Typic Torriorthents	fine, montmorillonitic, calcareous, frigid	30		
	Typic Torriorthents	fine-loamy, mixed, calcoreous, frigid, shallow	20		
	Typic Natrargids	fine, montmorillonitic, calcareous, frigid	10		
317	Typic Haplargids	fine-loamy, mixed, calcareous, frigid	60	Nearly level, stony Alluvial Fans	6,461
	Typic Haplargids	fine-loamy, mixed calcareous, frigid	10		
	Typic Torriorthents	loamy-skeletal, mixed, calcareous, frigid	10		
	Stony Land	------------------	20		
318	Typic Haplargids	fine-loamy, mixed calcareous, frigid	80	Nearly level terrace	9,693
	Typic Torriorthents	loamy-skeletal, mixed, frigid	15		
	Typic Haplargids	fine-loamy, mixed, calcareous, frigid	5		

Map Unit Number	Mapping Unit Classification*		Estimated % of Map Unit	Common Name	Total Acres
	Subgroup**	Family***			
319	Typic Haplargids	fine-loamy, mixed calcareous, frigid	60	Nearly level, alkali, Alluvial Fans	10,127
	Typic Haplargids	fine-loamy, mixed, calcareous, frigid	20		
	Typic Haplargids	coarse-loamy, mixed, calcareous, frigid	10		
	Typic Haplargids	coarse-loamy, mixed, calcareous, frigid	10		
320	Typic Torriorthents	fine, montmorillonitic, calcareous, frigid	80	Red colored Alluvial bottomland	27,658
	Typic Torriorthents	fine-loamy, mixed, calcareous, frigid	20		
321	Typic Torriorthents	coarse-loamy, mixed, calcareous, frigid	50	Red colored Alluvial bottomland and sand dunes	8,785
	Typic Torriopsamments	mixed, frigid	30		
	Typic Torriorthents	loamy, mixed, calcareous, frigid, shallow	15		
	Typic Torriorthents	fine, mantmorillonitic, calcareous, frigid	5		
TOTAL					512,854

*Mapping unit classification: refers to the U.S. Comprehensive Soil Classification. The system contains six categories. From highest to lowest levels of generalization these are order, suborder, great group, subgroup, family, and series (see Appendix B-2-1). This is a classification of the soil in the map unit.

**Subgroup--a subdivision of the great groups that emphasizes a process that is subordinate to the dominant processes affecting a soils development.

***Family--a subdivision of the subgroup which is used to distinguish mineral soils based on particle-size classes, mineralogy classes, calcareous and reaction classes, soil temperature classes, and soil depth classes.

APPENDIX B-2-21

GENERAL PROPERTIES OF THE SOILS IN EACH MAP UNIT

Soil Map Number	Slope %	Erosion Susceptibility (Class)		Hydrologic Group[3]	Available Waterholding Capacity (Inches)[4]	Suitability, Compacted Embankment[5]
		Water[1]	Wind[2]			
202	1-10	Low	3	B	3.60-5.32	Poor
204	6-30	Moderate	4L	B	1.40-6.5	Good
205	10-40	Low	4L	B	1.32-3.90	Poor
206	20-60	Moderate	4L	B	1.40-3.58	Poor
207	6-15	Low	3	B	3.74-6.50	Good
208	3-8	Low	2	B	3.6-4.9	Good
209	10-40	Low	1	A	1.44-3.5	Poor
214	0-3	Low	4	C	7.5-11.0	Poor to Good
301	0-6	Low	3	C	5.0-10.8	Fair
302	30-60	Moderate-High	4L	C	0.5-1.75	Poor
303	3-15	Moderate	5	B	3.0-11.0	Good
304	3-20	Low-Moderate	4L	B	1.5-7.25	Good
305	3-10	Low	3	B	2.86-8.16	Good
306	10-40	Low-Moderate	4L	B	1.5-7.25	Poor to Fair
307	0-6	Low	3	B	2.86-8.16	Good
308	6-30	Low	3	B	2.40-3.88	Poor to Good
310	6-30	Low	3	C	2.25-3.78	Poor
311	6-20	Low	3	C	1.26-1.60	Poor
312	6-40	Moderate-High	4L	B	1.40-3.75	Poor to Good
313	10-40	Moderate	4L	B	1.40-1.68	Poor
314	3-30	Low-Moderate	4L	B	4.64-7.20	Poor
316	3-10	Moderate-High	4	D	5.0-6.25	Poor
317	0-3	Low	3	B	5.20-6.00	Poor

Soil Map Number	Slope %	Erosion Susceptibility (Class)		Hydrologic Group[3]	Available Waterholding Capacity (Inches)[4]	Suitability, Compacted Embankment[5]
		Water[1]	Wind[2]			
318	0-3	Low	3	B	2.30-5.00	Fair
319	0-3	Low	3	B	2.30-10.05	Poor
320	0-3	Moderate	4	D	5.06-6.25	Poor
321	3-15	High	4L	A	4.8-10.80	Poor

1. Erodibility class - The susceptibility of a soil to erosion when no cover is present. Rate of soil displacement is influenced primarily by soil qualities, physical properties, rainfall intensity, and slope gradient. Considered was each of six items listed within each of the three classes when classifying the area. Classes and rating items are as follows:

Class

Low -Potential erosion is not significant to reduce productivity.
-They contain water stable aggregates.
-They have good infiltration and percolation rates.
-They have adequate depth to store most of the normal precipitation.
-They contain no restrictive layers.
-They occur on gentle slopes.

Moderate -Potential erosion is significant to reduce productivity but not to the point of entirely restricting production.
-They contain aggregates that are not water stable.
-They have moderate infiltration and percolation rates.
-They have moderate depths to store only part of the normal precipitation (AWC).
-They may contain restrictive layers.
-They occur on moderate slopes.

Severe -Potential erosion will cause a reduction in productivity to practically zero.
-They contain very unstable aggregates.
-They have slow infiltration and percolation rates.
-They have little soil for water storage.
-They contain restrictive layers.
-They occur on steep slopes.

2. Wind erodibility class - see Appendix B-2-4.

3. Hydrologic soil groups - ranking of soils from A to D referring to runoff potential ranging from A, having the lowest rates to D with the highest rates.

4. Available waterholding capacity - refers to the potential amount of water a soil can hold for plant use.

5. Suitability compacted embankment - refers to the suitability of a soil for use in constructing earthen dam reservoirs.

APPENDIX B-2-22

Description of Methodology Used to Determine Maximum Potential Forage Production

To calculate the maximum potential production of forage for each allotment, it is necessary to know:

a. the acreage of each range site by allotment

b. the animal unit months (AUMs) per acre by ecological climax condition for each range site.

Refer to Appendix B-2-2 (Soil-Site Productivity Potentials) for the acreage of each range site by allotment and the AUMs per acre.

Multiplication of the acres of a particular range site by the AUMs per acre of the corresponding range site results in the maximum potential production for that range site. Summation of the maximum potential production for all range sites within an allotment would result in the maximum potential production by allotment. Table B-12 shows these calculations for the Stewart Creek allotment.

TABLE B-12
POTENTIAL PRODUCTION BY RANGE SITE IN THE STEWART CREEK ALLOTMENT

	Range Sites	Acreage	AUMs/acre	Production (AUMs)	Production Per Acre in an Average Year (LBS)	Total Production (by range site) in an Average Year (LBS)
7"-9" Precipitation Zone	SU	6,450	.20	1,290	450	2,902,500
	VS	2,081	.10	208	300	624,300
	Ly	139,954	.20	27,991	500	69,977,000
	SwLy	22,448	.12	2,694	350	7,856,800
	Gr	253	.10	25	350	88,550
10"-14" Precipitation Zone	CU	2,086	.30	626	1,000	2,086,000
	Ly	5,819	.40	2,328	1,100	6,400,900
	SwLy	915	.20	183	900	823,500
	Sy	5,135	.40	2,054	1,200	6,162,000
	Sa	3,506	.40	1,402	1,400	4,908,400
	SU	344	.25	86	500	172,000
	TOTALS	188,991		38,887		102,001,950

APPENDIX B-2-23

Regional Cultural Resource Sampling Design (Metcalf, 1976)

The approach to be utilized in the attempt to find a predictive model for archeological site locations in the study area is designed after considerations given to "location analysis" at a meeting of the Southwest Anthropological Research Group in 1971 (Gummerman 1971). At the meeting, archeologists working in the greater southwestern United States discussed approaches to studying the problem of "why archeological sites are located where they are." Central to the group's research design is classification of the region to be studied in terms of environmental variables that held economic importance to the prehistoric peoples of a given area during a given time period. If the specific resources a prehistoric group sought during certain times of the year can be discovered, then an understanding of why people chose to live where they did is possible. If such a model for prehistoric settlement patterns could be discovered, it would be useful as a planning tool for those involved with development.

Formation of such a model depends upon the translation of a series of basic assumptions about prehistoric economies into hypotheses that can be tested by archeological survey. Judge (1971: 41) has stated that following hypotheses as predictive statements for the southwestern United States:

1. Hunting (Paleo-Indian Period)
   Key resources:
   a) Water sources habitually frequented by mega-fauna.
   b) Grassland areas capable of supporting large herds within a limited geographical area.
2. Collecting or Intensive Foraging (Archaic Periods)
   Key resources:
   a) A highly diverse biotic community (i.e., a wide variety of flora and fauna).
   b) Concentrations of this biotic diversity within a limited geographical area.

To Judge's list we have added:

3. Ethnohistoric Period
   Key resources:
   a) Diverse biotic community
   b) Adequate forage and water for horses.

Using this as a starting point the following hypotheses have been adapted to the BLM-EIS area from Judge's basic list (1971: 42):

H1.Paleo-Indian sites should be located near water sources accessible to areas of potential grasslands during eras of moister climate. Springs, permanent drainages, playas, and interdunal ponds should have a higher density of Paleo-Indian materials than do other areas.

H2.The Key components of a communal procurement site for the species being hunted:
   a) A topography suitable for channeling animals to a predetermined location.
   b) A collection area of good grazing land for the species being hunted.
   c) An arroyo, cuesta, cliff or other topography suitable for trapping or detaining animals long enough to kill them.
   d) Nearby location for a camp with access to water for use during butchering (Frison: various).
   Areas where these conditions are all satisfied will be the most likely location for major kill sites.

H3.Archaic period sites with the exception of communal procurement sites, should be situated in ecozone areas where there is diversified plant and animal life in a limited area. Topographic breaks such as escarpments, buttes, mountains, canyons and sand dune fields within the study area should provide suitable diversity of species to have been attractive to hunter-collectors.

H4.As a correlation to H3, areas of slight topographic relief with climax transition vegetation should have a relatively lower site density than do areas of varied relief and vegetative cover. Where interrupted by major drainages, springs, or topographic relief, site densities should increase.

H5.During the ethnohistoric era when horses were present as a beast of burden and transport, some modification of a basic hunting and foraging subsistence strategy should be present because of increased mobility. However, diversity of habitat should still be important. Permanent drainages should be the single best area for habitations during this era, with springs, ponds, and other watered localities also important.

A certain amount of overlap in the key resources for each major time period is evident in the above hypotheses. Water, for example, is the basic need for man and his prey, and was a critical factor during all eras. Also, diversity of food sources within a limited area distribution remained important through time. Frison (various) and others have demonstrated that communal procurement was practiced from Paleo-Indian to Historic times and this pattern gives evidence for the study area at Finly, Wardell, and Eden-Farson.

Thus, sites of all ages can be expected to be found in areas of the most favored habitat. The major shifts in settlement patterns would be expected to occur between the Paleo-Indian era when big game hunting seems to have been the major subsistence activity, and the mixed base subsistence oriented Archaic era; and a second shift when Archaic lifeways were interrupted by the increased mobility created by the horse. Certain "core" areas were probably used during all eras. Outside these core areas, some localities should have more sites of one time period than sites of other time periods.

APPENDIX B-3-1

Development of HYMO, From the Report: Surface Runoff and Soil Loss Estimates of the Northeastern Great Divide Basin Using HYMO, by Verne E. Smith, Water Resources Research Institute, University of Wyoming, December 1976

As part of the environmental assessment and impact evaluation of range management practices, the Bureau of Land Management contracted with the Water Resources Research Institute at the University of Wyoming to provide an analysis of the surface hydrology of study areas adjacent to and south of the Crooks and Green Mountains of central Wyoming. Specifically, storm runoff and soil losses were estimated through the use of the hydrologic model, HYMO (Williams and Hann 1973) in a manner similar to that used for southwestern Wyoming (Smith 1976b).

HYMO is a computer program developed by the Agricultural Research Service of the U.S. Department of Agriculture to estimate surface runoff and soil loss. One of the operations it can perform is to transform rainfall data into a runoff hydrograph. Required input data are the basin characteristics of area, elevation difference, and length, and the Soil Conservation Service's soil-cover complex number. The rainfall must be input as cumulative amounts, preferably in short time increments of five to fifteen minutes.

Runoff can be combined from several sub-basins by routing and adding hydrographs. To route flow, rating curves must be input or computed and travel times must be computed from the appropriate rating curves. Rating curves are computed for Manning's equation, for which data must be supplied for the flood plain and channel cross-sections, their slopes, and Manning's roughness coefficients. Input data for the travel time of a stream reach are rating curves of the reach, the reach length, and the reach slope.

Soil loss is computed from a modified form of the universal soil loss equation (Wischmeier and Smith 1965), for which the input data are the soil-credibility factor and cropping-management factor. The model will also route a hydrograph through a reservoir; but this option was not used in this study.

Study basin characteristics required as input to HYMO were determined from field and topographic map measurements made by personnel from the BLM Rawlins District. For soil-cover complex number and cropping-management factor ranges of values were determined for each sub-basin.

Runoff and soil loss vary from year to year depending upon the amount of precipitation that occurs. To evaluate general conditions, a set of rainfall amounts and number of occurrences per year were determined for recurrence intervals of two, ten, and 100 years.

The maximum storm events were determined from the precipitation frequency-duration program, PREFRE (Mumford 1976), developed by the National Weather Service and modified by the Bureau of Reclamation. The time distribution of rainfall was developed using the intensities for various durations from PREFRE. The most intense protion of the storm was assumed to occur at fifty minutes. The assumed hyetograph was unitized and then applied to various magnitude storms to obtain their rainfall distributions.

The number of occurrences of various magnitudes of storm was determined by applying a Poisson distribution to daily summer rainfall events of Muddy Gap and Rawlins — the best climatologic stations available. Table B-13 shows the precipitation events that were determined.

For each basin, runoff and soil loss estimates were computed for a range of curve numbers and crop-management factors for the various magnitude storms. No runoff resulted from storms of less than 0.3 inches. The individual runoffs and soil losses were then added according to Table B-13. These estimates were used to develop the curves predicting runoff and soil loss (see Figure B-2).

These curves represent relative estimations of runoff and soil loss for summer precipitation events. The values should never be considered to be exact for several reasons. Several assumptions had to be made regarding precipitation events. There are no precipitation data available within the study areas. Records from the closest climatological stations had to be used. The assumed precipitation events had to be considered to occur uniformly over each entire study basin.

The soil loss equation was modified to fit data for research areas in Texas (Williams and Hann 1973). The model may require calibration to Wyoming basins. However, there are no data upon which to make the calibration. The slope-length-gradient factors used for the basins required selecting values considered typical of basins, which are considerably different in configuration from crop fields.

The soil loss estimates developed herein are based on the universal soil loss equation. These estimates are not necessarily sediment yield. As described by Wischmeier (1976) the universal soil loss equation was designed to predict soil loss from sheet and rill erosion. Some or all of the eroded soil may be deposited within the basin. Sediment yield includes erosion from channel cutting, but deposition and channel erosion are not included in the universal soil loss equation. For the total annual sediment yield, erosion due to snowmelt runoff can be a significant contributor that should be taken into account. Only probable summer rainstorms were applied in this study. It should be remembered that recurrence intervals are strictly a probabilistic concept. A ten-year occurrence does not mean that this value will occur in a given ten years. It may occur several times or not at all in a given ten years. What it does mean is that over a long time period, say five hundred years, one-tenth of the values will be of the given amount or less.

REFERENCES FOR APPENDIX B-3-1

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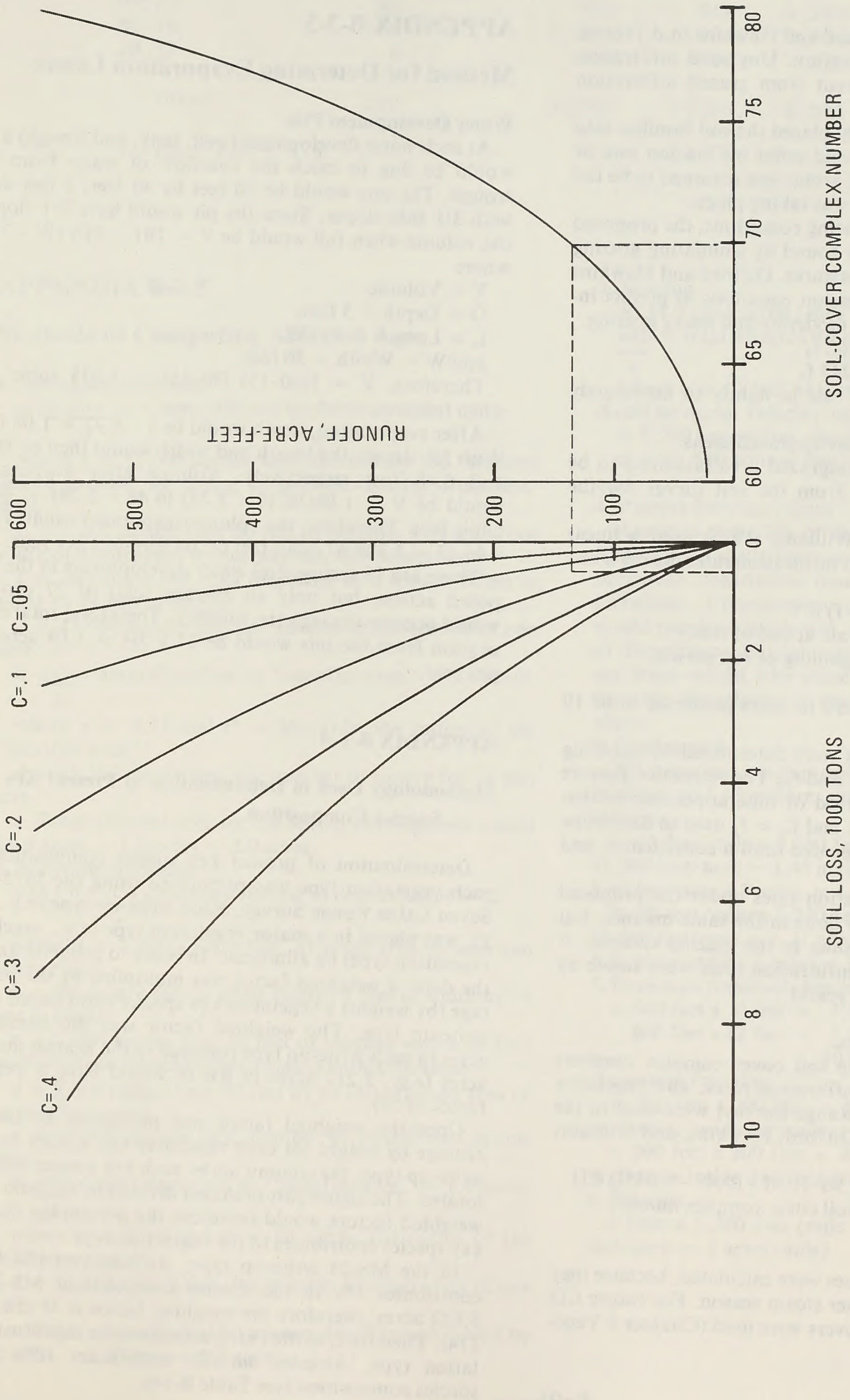
TABLE B-13
ASSUMED STORM EVENTS

Precipitation (inches)	Number of Occurrences per Return Period		
	2 Years	10 Years	100 Years
2.60			1
2.03			1
1.66		1	
1.40		1	1
1.00	1	1	1
.90		1	1
.80	1	1	2
.70		1	2
.60	1	1	1
.50	1	3	4
.40	2	3	4
.30	2	2	4

RUNOFF AND SOIL LOSS: 10 YEAR RECURRENCE, BULLS CREEK, WYOMING

Figure B–2



APPENDIX B-3-2

Determination of Runoff by Use of Infiltration Rates

Appendix B-3-1 outlined the HYMO runoff model; this appendix will explain how infiltration rates and cover were used to develop the input to the model.

Infiltration Rates

A literature review by Gifford and Hawkins (n.d.) found that grazing influences infiltration. Ungrazed infiltration rates were statistically different from grazed infiltration rates.

The Seven Lakes soil survey placed the soil families into soil hydrologic groups. The mid-point infiltration rate of the particular soil hydrologic group was assumed to be the infiltration rate if no grazing was taking place.

Infiltration rates under existing conditions, the proposed action, and alternatives were found by simulating grazing cycles within the particular pastures. Gifford and Hawkins (n.d.) developed linear regression equations to predict infiltration rates under light to moderate and heavy grazing.

Equation 1: $f_L = .397 + .562\ f_0$

Equation 2: $f_H = .423 + .247\ f_0$

Where: f_L = Infiltration rate in lightly to moderately grazed areas.

f_H = Infiltration rate in heavily grazed areas.

f_0 = Infiltration rate in ungrazed area (assumed to be the infiltration rates taken from the soil survey for the Seven Lakes area).

Gifford, Hawkins, and Williams (1975) used a linear curve to predict a recovery in infiltration rates during a rest period.

Equation 3: $f_R = f + (f_0 - f)\ t/T$

Where: f_R = Infiltration rate at end of rest.

f = Infiltration rate at beginning of rest period.

t = Rest time in years.

T = Time for full recovery in years (assumed to be 10 years for Seven Lakes).

Existing infiltration rates were determined by applying equations 1 and 2 to find f_L and f_H. The respective pasture was then rested for the period of time applicable to that pasture, with equation 3 (f_L and f_H = f) used to determine recovery. This cycle was repeated until a consistent f_L and f_H and f were found.

Determination of infiltration rates under the proposed action and alternatives was done in the same manner, but rest periods differed according to the grazing systems. It was found that nearly all infiltration rates were stable by the end of the short term (8 years).

Runoff Methodology

To determine hydrologic soil cover complex numbers (curve numbers or CN), infiltration rates, and vegetative cover (from Seven Lakes Range Survey) were used in the following equation (from Gifford, Hawkins, and Williams 1975):

Sagebrush-Grass: $CN = 96 - 10.5f - (0.49 - 0.035f)\ CD$

with CN = Hydrologic soil cover complex number

f = Infiltration rate

CD = Cover density

For f, the minimum values were calculated, because they occurred during the summer storm season. For future CD the projected vegetative covers were used (Chapter 3 Vegetation).

The end result was a curve number for ungrazed, lightly to moderately grazed, and heavily grazed areas for each pasture with a representative drainage for existing, short-term and long-term conditions.

The mean curve number for each pasture was determined by weighting CNs by acres in the particular grazing intensity classes (Appendix B-3-8). The grazing intensity classes were related to Gifford's intensity classes as shown in Table B-18.

APPENDIX B-3-3

Method for Determing Evaporation Losses

Water Development Pits

At each water development (well, tank, and trough) a pit would be dug to catch the overflow of water from the trough. The pits would be 30 feet by 40 feet, 5 feet deep with 3:1 side slopes. Since the pit would have 3:1 slopes, the volume when full would be V = D(L - 3D) (W - 3D), where

V = Volume,

D = Depth = 5 feet,

L = Length = 40 feet,

and W = Width = 30 feet.

Therefore, V = 5(40-15) (30-15) = 1,875 cubic feet when full.

After evaporation, depth would be 5 - 3.92 = 1.08 feet. With 3:1 slopes, the length and width would then be 16.48 and 6.48 feet respectively. Volume after evaporation would be V = 1.08(16.48 - 3.24) (6.48 - 3.24) = 46.33 cubic feet. Therefore, the volume evaporated equals 1,875 - 46.33 = 1,828.67 cubic feet or .04 acre-feet per year.

There are 36 springs and water developments in the proposed action, but only an average total of 27 projects would operate through the summer. Therefore, total evaporation from the pits would be 27 x .04 = 1.08 acre-feet per year.

APPENDIX B-3-4

Methodology Used in Determination of Present Key Species Composition

Determination of present key species composition for each vegetation type was performed using the 1975-1976 Seven Lakes Range Survey. Each write-up type (e.g., RB-2), was placed in a major vegetation type (e.g., sagebrush vegetation type) by allotment. In order to properly analyze the data, a weighted factor was multiplied by the percentage (by weight) a vegetative key species contributed to the write-up type. The weighted factor was the number of acres in each write-up type rounded to the nearest hundred acres (e.g., 5,212 acres in RB-16 would have a weighted factor of 52).

Once the weighted factor was multiplied by the percentage by weight for each vegetative key species for each write-up type, the column under each key species would be totaled. The figure just obtained divided by the sum of the weighted factors would represent the percentage that that key species contributes to the vegetation type.

In the MS-24 write-up type, *Atriplex nuttallii* (Atnu) contributes 3% to the species composition. MS-24 has 5,822 acres; therefore the weighted factor is 58 (58 x 3 = 174). Therefore, in the Ferris allotment the sagebrush vegetation type, *Atriplex nuttallii* contributes 10% to the species composition (see Table B-14).

TABLE B-14
SAMPLE CALCULATIONS OF PRESENT KEY SPECIES COMPOSITION

(Sagebrush Type - Ferris Allotment)

Write-Up Type	Weighted Factor	Atnu	Cela	Artr	Agsp
MS-24	58	174	232	928	580
MS-25	86	516	516	1,290	8,609
MS-26	180	2,520	900	2,880	0
JM-18	6	60	36	132	0
Total	330	3,270	1,684	5,230	9,189

3,270 ÷ 330 = 9.9

APPENDIX B-3-5

Methods of Computing Affected Area

1. Spring development

a. $\frac{(a+b+c)}{d}$ = area affected by development = .4

where a = 15,000 square feet, 100 feet by 150 feet area fenced around the spring to prevent damage from livestock,

b = 1,200 square feet, 60 feet of pipeline with a 20 foot width of disturbance for installation with a backhoe,

c = 28 square feet area displaced by a trough 2 feet in width by 14 feet in length,

d = 43,560 square feet, the number of square feet in one acre.

b. $\frac{\pi r^2}{d}$ = acres disturbed by "sacrifice area" = 1.6 acres

where π = 3.14 and r^2 = 50 yards, the radius of the "sacrifice area,"

d = 43,560 square feet, the number of square feet in one acre

c. Total affected area for the spring development would be .4 acres + 1.6 acres = 2.0 acres.

2. Water development

a. $\frac{(a+b+2c+d)}{e}$ = area affected by development = .2

where a = 5,000 square feet, affected area by well and storage tank,

b = 28 square feet, a water trough 2 feet in width by 14 feet in length,

c = 1,000 square feet, 50 feet of pipeline with a 20 foot width of disturbance for installation with a backhoe,

d = 2,500 square feet, 50 feet by 50 feet affected area of an overflow pond,

e = 43,560 square feet, number of square feet in one acre.

b. $\frac{\pi r^2}{d}$ = acres disturbed by "sacrifice area" = 1.6 acres

where π = 3.14 and r^2 = 50 yards, the radius of the "sacrifice area,"

d = 43,560 square feet, the number of square feet in one acre.

c. Total acres affected by a water development would be .2 acres + 1.6 acres = 1.8 acres.

3. Fencing

BLM Type 1 cattle fence

$\frac{axb}{c}$ = total affected area = 1.5 acres/mile

where a = 12 feet, this includes a two-tracked trail, produced by motor vehicles, on each side of the fence,

b. 5,280 square feet, the number of feet in one mile.

c = 43,560 square feet, the number of square feet per acre.

4. Pasture boundary signs

Assumed to be 5% of the total affected area for 3. The BLM Type 1 cattle fence requires repeated travel along the previously constructed fence, thus causing additional disturbances. Construction of a pasture boundary fence would require a single trip, thus causing a minimal amount of disturbance. Partial construction of the pasture boundary fence would take place along an existing road; therefore, the disturbance to the area would already have taken place.

5. Cattleguard

All proposed cattleguards would be constructed on an existing road; therefore, no additional disturbance would take place.

a. 12 feet/mile x 5,280 feet/mile = 63,360 feet/mile ÷ 43,560 feet/acre = 1.45 acres/mile
1.45 feet/acre x 3 miles = 4.35 acres disturbed

b. 10 feet/mile x 5,280 feet/mile = 52,800 feet/mile ÷ 43,560 feet/acre = 1.21 acres/mile
1.21 acres/mile x 3 miles = 3.63 acres disturbed

7. Exclosure (reservoir fencing)

a. 600 feet x 6 feet = 3,600 feet
600 feet x 12 feet = 7,200 feet
10,800 feet ÷ 43,560 feet/acre = .2 acres on fenceline

b. 200 feet x 200 feet = 40,000 feet ÷ 43,560 feet/acre = .9 acres inside permanent exclosure

c. 200 feet x 200 feet = 40,000 feet ÷ 43,560 feet/acre = .9 acres inside livestock watering area.

8. Pipeline

1 foot x 5,280 feet (mile = 5,280 feet/mile ÷ 43,560 feet/acre = .1 acres/mile)

APPENDIX B-3-6

Proper Allocation of Livestock Competitive Forage for Wild Horses

In the proposed action, 517 winter sheep AUMs were allocated to wild horses (Table 1-6). This number was calculated using yearlong diet similarity values from Hansen (1975) between wild horses and sheep (see Table B-15). However, during the summer grazing season, most of the wild horses' diet competition is actually with cattle, and the summer cattle-horse diet similarity values are much higher.

Additionally, the reservation of forage for wild horses should be based on the maximum number of horses to be permitted in each allotment in accordance with the proposed Seven Lakes Herd Management Area Plan. If the numbers are changed in this proposed plan, the proper allocation must also be changed.

Below are the calculations which are made to determine the proper forage allocation for wild horses by allotment.

Cattle Competition

Ferris: (21)(6 mos.(.612) = 77 summer cattle AUMs

Stewart Creek: (57)(6 mos.) (.612) = 209 summer cattle AUMs

Cyclone Rim: (57)(3 mos.) (.214) = 37 winter cattle AUMs

Conversion of cattle AUMs to winter sheep AUMs

(77 summer cattle AUMs)(2.07)[1] = 159 winter sheep AUMs

(209 summer cattle AUMs)(1.71)[2] = 357 winter sheep AUMs

(37 winter cattle AUMs)(1.41)[3] = 52 winter sheep AUMs

1. Ratio of winter sheep to summer cattle AUMs in the Ferris allotment = 2.07
2. Ratio of winter sheep to summer cattle AUMs in the Stewart Creek allotment = 1.71
3. Ratio of winter sheep to winter cattle AUMs in the Cyclone Rim allotment = 1.41

Sheep Competition

Ferris: (21)(6 mos.)(.401) = 51 winter sheep AUMs

Stewart Creek: (57)(6 mos.)(.401) = 137 winter sheep AUMs

Cyclone Rim: (57)(3 mos.(.401) = 69 winter sheep AUMs

(57)(6 mos.)(.212) = 73 winter sheep AUMs

Ratio of winter sheep to summer sheep in the Cyclone Rim allotment = 1.89

Thus (73 S.S. AUMs)(1.89) = 138 winter sheep AUMs

Competitive forage in terms of winter sheep by allotment for wild horses.

Ferris: 159 + 51 = 210

Stewart Creek: 357 + 137 = 494

Cyclone Rim: 52 + 69 + 138 = 259

Total proper allocation: = 963 - 464 = 499 winter sheep AUMs

Proposed allocation (Table 1-6)

Underallocation

TABLE B-15

DATA NEEDED FOR COMPUTATION OF WILD HORSE-LIVESTOCK COMPETITIVE FORAGE DIET OVERLAPS BY ALLOTMENT

Allotment	Max. # Horses	Competing Livestock	Season	Fractional Diet Overlap*
Ferris	21	Cattle	Summer	.612
	21	Sheep	Winter	.401
Stewart Creek	57	Cattle	Summer	.612
	57	Sheep	Winter	.401
Cyclone Rim	57	Sheep	Summer	.212
	57	Sheep	Winter	.401
	57	Cattle	Winter	.214

*From Hansen 1975.

APPENDIX B-3-7

Socioeconomic Analysis

Criteria For Assessment of Significance

Impacts of the proposed action were evaluated using the following criteria:

Highly Significant:

Resulting in noticeable lasting change in the social and/or economic conditions for most residents of the region; or, resulting in a major change in the social or economic conditions for some identifiable smaller population group.

Significant:

Resulting in a noticeable, lasting change in the social or economic conditions for some identifiable group residents.

Insignificant:

Resulting only in changes in the social or economic conditions for any group of residents which are expected to be barely noticeable or to be not lasting.

Neutral Impacts:

Resulting only in unnoticeable changes in the social or economic conditions for any group of residents.

Methodology and Calculations

Employment

A. To determine estimates of the contribution to regional employment by livestock operations in the Seven Lakes area the following methodology was used.

1. First it is important to understand that no ranch operation is headquartered in the Seven Lakes area. Second, the AUMs under license to most operators using the area typically make up only part of their operations. Therefore, it is not possible to classify them as either sheep operations or cattle operations. To determine estimates of employment generated by the Seven Lakes forage resources it was necessary to determine man equivalents (labor) per AUM for both sheep and cattle AUMs. A recent study in Wyoming (Stevens 1975[1]) determined that one man equivalent of labor was required for every 314 animal units in a typical cattle operation. A similar study (Stevens 1971) indicated that one man equivalent of labor is required for 865 animal units in a typical sheep operation. Employment is estimated for the ES area below based on the above relationships.

2. Existing Situation (Average action AUMs for past 5 years)

a. Employment generated by sheep operations: 7,414 sheep animal units divided by 865 equals 8.57 man equivalents labor.

b. Employment generated by cattle operations: 164 cattle animal units divided by 314 equals .52 man equivalents labor.

c. Total labor generated at present by livestock operations equals 9.09 man equivalents.

3. Proposed Action (Short Term)

a. Employment generated by sheep operations: 13,824 sheep animal units divided by 865 equals 15.98 man equivalents.

b. Employment generated by cattle operations: 967 cattle animal units divided by 314 equals 3.08 man equivalents.

c. Combined total: 19.06 man equivalents of labor required by the short term.

4. Impacts with the proposed action:

a. The proposed action would, by 1986, generate 19.06 man equivalents employment as opposed to 9.09 for the present situation. The difference, 9.97 man equivalents, represent an insignificant impact. Employment in the long term would be approximately 5% higher than the short term using the above methodology.

b. Construction employment generated by construction of the proposed range improvement projects is estimated in Table 1-11 to equal approximately 10 man equivalents. The necessary construction workers should be readily available from unemployed in the existing labor force.

5. Conclusion

The proposed action would result in an increase in employment which is insignificant.

Public Finance

The contribution to regional assessed valuation can be estimated by converting current actual use AUMs from Table 1-1 to sheep and cattle units. Assessed valuation figures per sheep and cattle unit were calculated (17,793 average active sheep AUMs for the past 5 years, times 5/12 = 7,414 sheep units; 1,970 cattle AUMs divided by 12 = 164 cattle units; $7,166,912 total valuation for cattle for the three county region divided by 175,245 head of cattle in 1975 = $40.90 per cow unit). Similarly, $828,129 total valuation for sheep in the region divided by 169,671 head equals $4.88 assessed valuation per sheep unit. Using 7,414 sheep units times $4.88 equals $36,180, and 164 cow units times $40.90 equals $6,708; $36,180 plus $6,708 equals $42,888 assessed valuation for ES area cattle and sheep for 1975, and approximately .01% of total regional assessed valuation.

Income

A. Estimating revenues and costs originating from Seven Lakes area resources.

1. Livestock income was determined by using data for "typical" operations (Gee 1975), U.S. Department of Agriculture Economic Research Services and Stevens 1975, Agricultural Experiment Station, University of Wyoming).

a. Sheep operations: 1974 total revenue per sheep unit equals $35.78. By knowing the returns per animal unit, the total revenue per year can be determined by simply multiplying the number of sheep units for a given year by the appropriate revenue figures.

b. Cattle operations: Total revenue per cow unit was determined for the "typical" cattle operation, and adjusted using the consumer price index to be expressed in 1974 figures. The resultant revenue per cattle unit is $128.02.

c. Construction and Maintenance Income: This includes all of the construction, maintenance, replacement and supervision activities that are included in the proposed action.

d. Wild Horses: The procedure for determining the value for wild horses is based on the fact that there is a trade-off between wild horse and domestic livestock production. For example, domestic livestock must be reduced in order to accommodate the wild horses. This reduction is reflected as a loss of revenue. The fact that the public is willing to sacrifice domestic livestock production in order to insure the existence of wild horses indicated that the value for the horses is at least as much as the foregone domestic livestock production. Since 464 winter sheep AUMs are proposed to be allocated to wild horses, foregone income would be calculated as follows: 464 winter sheep AUMs x 5 ÷ 12 = 193 sheep units. This would be the amount of forage which could support 193 sheep year round. Six thousand nine hundred and six dollars (193 x $35.78 = $6,906), the revenue which could have been generated if the forage would actually have been allocated to sheep production.

2. Recreation benefits are determined by forecasting visitor days in the short and long term for the various activities and then multiplying these by the appropriate daily values. The result is a recreation value for hunting. The daily values for these activities are as follows:

a. Pronghorn: $75.00/day[2]

b. Upland Game Birds: $6.00/day[2]

3. The results of the above approach for estimating income originating from the Seven Lakes forage resources are shown in Tables 2-38 and 3-13. Table 3-13 summarized income associated with the proposed action. Table 2-38 on the other hand, gives the same information for the present situation. By using the two tables concurrently, the economic impacts of the proposed action are easily determined.

B. Determining secondary or multiplier effect:

1. To total income generated in the Seven Lakes area, apply multiplier to determine additional income injected into the regional economy. The income multipliers were obtained from the BLM Socio-economic Data System.

Population/Housing/Infrastructure Needs

In the typical situation, population is a function of changes in the labor force. Since the proposed action would not result in any significant change in employment, there would be no impacts upon population either. Similarly, if there are no increases in population, due to the proposed action, there would be no increased housing or infrastructure/service needs. Because of the relationship between employment, population, housing, and infrastructure, and because there are only insignificant changes in employment anticipated, a detailed analysis of these socioeconomic elements is neither necessary nor justified.

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[1] Stevens determined that, for example, a typical cattle ranch operation in Wyoming consisted of 942 CUs and required 3 man equivalents of labor in 1972.

[2] These values were obtained from Instruction Memorandum 76-455. This is a BLM Instruction Memorandum out of the Washington Office that describes that procedure for benefit-costs analysis.

APPENDIX B-3-8

METHOD OF DETERMINING INTENSITY OF GRAZING

Slope, terrain, distance to water, and vegetation type are among the factors that influence the distribution of livestock on the range (Mueggler 1965). W. F. Mueggler used multiple regression analysis to develop an equation for predicting relative grazing use (intensity) from the percent of slope and the distance in yards that livestock would move upslope during grazing (Mueggler 1965).

The Mueggler Equation was used in predicting relative grazing use in the Seven Lakes area. The equation is:

$$\hat{Y}{:}= 107.06 + 1.00\ X_1 \quad 95.37e \quad .001\ X_2$$

Where $\hat{Y}{:}$ = Predicted accumulated relative use to the specified upslope distance. Total use on the area was considered to be 100%.

X_1 = Slope steepness in percent.

X_2 = Distance upslope in yards.

e = Exponential Function.

Estimates of grazing intensity in acres per AUM were based on the assumption that the livestock use pattern is circular. X_2 is the radius in yards from water.

The Mueggler Equation is used in determining X_2:

$$X_2 = -1 \qquad \frac{\text{Log } (X_1 - \hat{Y}{:}+ 107.06) - \text{Log } 95.37}{\text{Log } (2.71828)\ .001}$$

Mean allotment slopes were used for X_1, and relative use $(\hat{Y})$ was assumed to be 100% in solving the equation for X_2. When $\hat{Y} = 100\%$, all livestock are within Radius X_2.

The area inside Radius X_2 (A_{X_2}) was found by:

$$A_{X_2} = II\ (X_2)^2\ K$$

Where II = 3.14159

X_2 = Radius in yards

K = Conversion factor of square yards to acres

(2.066×10^{-4})

Area A was then "stocked" at the same rate as the proposed or existing grazing systems by using the following equation:

$$AM_{X_2} = \frac{AA_{X_2}}{TA} \times AX_2$$

Where A = Accumulated acreage within X_2.

TA = Total used acres for that allotment.

AA = AUMs for that allotment or pasture.

AM_{X_2} = AUMs within the Area A of Radius X_2.

Actual use AUMs were used for existing conditions for each allotment. For the short and long term, the proposed AUMs were divided by the number of pastures to determine the use for each allotment.

The accumulative relative use $(\hat{Y})$ was incremented in 5% intervals from 100%. X_2 and A_{X_2} were calculated fpr each Y using the above equations.

Acres within each 5% relative use class were found by:

$$AC = AX_2 - A\ (X_2 - 1)$$

Where AC = Acres in each relative use class.

A_{X_2} = Accumulative acres in relative use class.

$A(X_1-1)$ = Accumulative acres in the relative class 5% lower than A_{X_2} .

Grazing intensity in acres per AUM was found by:

$$GI = \frac{AC}{(AM_{X_2} \times K)}$$

Where GI = Intensity in acres/AUM within each 5% relative use class.

AC = Actual acres within each 5% relative use class.

AM_{x_2} = Total AUMs for Area X_2.

K = .05 (5%) of the total AUMs for Area X_2 in each 5% relative use class.

Table B-16 shows the grazing intensity classes that were used.

The break points for the classes were found by a power curve fitting. The percent of total model acres in each intensity class was found, then the total allotment acres in each intensity class was estimated by:

$$AA = MA \times \frac{TA}{100}$$

Where AA = Allotment acres by intensity class.

MA = Percent acres by intensity class from circular model.

TA = Total acres used in allotment.

Grazing intensity near water was estimated by power curve fitting:

$$GI = a\ X_2 b$$

Where GI = Grazing intensity.

X_2 = Distance upslope from water.

a and b = Regression coefficients.

When the above relationship was found from the circular model data, intensity was found by determining GI where X_2 = 100 yards.

Existing grazing intensity was found using the above method, but it was assumed that livestock distribution would improve under the proposed grazing systems. Therefore, X_2 was increased 25% for future intensities; this means that with 0% slope, livestock would walk 2 miles from water under existing conditions and 2.5 miles under the conditions anticipated under the proposed grazing systems.

This methodology for estimated grazing use was programmed in Fortran IV for a Burroughs B1700 computer. Readouts of the computer calculations follow in Table B-17. The intensity classes were then converted to Gifford's Intensity Classes as shown in Table B-18.

TABLE B-16
GRAZING INTENSITY CLASSES

Class	Acres/AUM
Slight	Greater than 75.0
Light	16.0 to 75.0
Moderate	5.5 to 16.0
Heavy	2.0 to 5.5
Severe	Less than 2.0

TABLE B-17
INTENSITY OF USE BY ALLOTMENT*
(in acres)

Allotment and Intensity Class	Present	Proposed Action	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Ferris								
Slight	66,911	64,427	65,743	68,345	64,427	65,839	65,581	64,427
Light	1,222	3,345	2,218	-	3,345	2,139	2,356	3,345
Moderate	155	421	282	-	421	269	300	421
Heavy	41	109	73	-	109	70	77	109
Severe	16	43	29	-	43	28	31	43
Stewart Creek								
Slight	178,611	142,083	165,686	188,991	142,083	155,368	157,229	142,083
Light	8,785	36,243	19,470	-	36,243	27,302	26,650	36,243
Moderate	1,158	7,522	2,760	-	7,522	4,534	3,686	7,522
Heavy	309	2,153	753	-	2,153	1,246	1,000	2,153
Severe	128	990	322	-	990	541	426	990
Cyclone Rim								
Slight	238,945	241,821	253,745	255,518	241,821	255,518	255,518	241,821
Light	10,555	11,602	1,509	-	11,602	-	-	11,602
Moderate	4,124	1,523	194	-	1,523	-	-	1,523
Heavy	1,259	405	50	-	405	-	-	405
Severe	635	167	20	-	167			167

*Acres

TABLE B-18
CONVERSION OF SEVEN LAKE'S INTENSITY CLASSES TO
GIFFORD'S INTENSITY CLASSES

Seven Lake's Intensity Classes		Gifford's Intensity Classes
Slight	=	Ungrazed
Light and Moderate	=	Light to Moderate
Heavy and Severe	=	Heavy

APPENDIX B-3-9

Methodology for Determining Future Key Species Composition in 1998

Percentage numbers of future key species composition are a conservative estimation based upon the grazing system, season of use, class of livestock, and professional judgment.

The two pasture deferred rotation, utilizing treatments A, B, and C, would cause the grass species to increase 2% or 3%. In treatments B and C the grass species would receive a rest during the growing period allowing an increase in seed production and seedling establishment.

The sagebrush would be expected to increased approximately 5%. Sagebrush would receive grazing pressure during the winter by sheep. The sagebrush would not receive a significant amount of grazing pressure by cattle in the spring and summer seasons.

The grass species in the Stewart Creek allotment would not be expected to change in percent composition by 1998 due to grazing season-long through the summer 2 years out of 3. Resting until seedripe the third year would allow increased seed production and seedling establishment. The sagebrush would be expected to increase approximately 5% because the grazing pressure would occur during the winter season and the sagebrush would be allowed to grow relatively unhindered during the spring and summer months.

Future key species composition in 1998 for the Cyclone Rim allotment would be considered to remain the same as the present composition. The seasonal grazing system proposed for the Cyclone Rim allotment is similar to the management used in the past.

APPENDIX B-3-10

Methodology for Predicting Range Condition

The present range condition information was determined by using a Soil Conservation Service method (refer to Appendix B-2-2). In determination of the amount of change in acreage by condition class at the long-term, consideration was given to the grazing system used, the type and amount of vegetation present, and changes recorded in cited studies (Chapter 3).

Therefore, for the ES area it was concluded that:

1. Under the two- and three-pasture deferred-rotation systems with season-long winter sheep grazing, 25% of the acres in each condition class would advance to the next highest condition class. For example, 25% of the acres in the fair condition class would advance to the good condition class.
2. Luman pasture would receive grazing from December 15 to March 31. This would allow the vegetation to grow without hinderance from livestock grazing. A large proportion of the pasture is the greasewood vegetation type which would not improve by management; therefore 15% of the acres of each condition would advance one condition class.
3. Summer sheep use of approximately 1/3 of the Cyclone pasture would result in 5% of the acreage in fair condition to degrade to poor condition. In the remaining 2/3 of the pasture, no grazing would take place during the growing period of the vegetation; therefore 20% of the acreage in each condition class would advance to the next highest condition class.
4. Lost Creek pasture would receive rest for a full year the first 3 years out of 4, therefore allowing the vegetation to improve in vigor and production. Following incorporation of the Lost Creek pasture with the Luman Pasture, no summer grazing would occur; therefore, the vegetation would grow unhindered by livestock use. Thirty percent of the acres in each condition class would advance to the next highest condition class.

APPENDIX B-3-11

Pronghorn AUMs Available with Water Development

The amount of forage available to pronghorn with the development of water was calculated by converting the summer cattle animal unit months (AUMs) unsuitable (as a result of no water) to pronghorn AUMs. First, the acres per pronghorn AUM was calculated using the PUF tables and the range survey on 20 range survey write-up types. Then, the average ratio between the summer cattle and pronghorn acres/AUM was calculated (4.62). Then, the unsuitable summer cattle AUMs were converted to pronghorn AUMs (18,572 ÷ 4.62 = 4,020). These 4,020 pronghorn AUMs were divided by the number of months that water was critical (4 months — 4,020 AUMs ÷ 4 months = 1,005). Thus, 1,005 pronghorn could be supported on the available forage from the water developments. However, only an estimated 300 to 800 animals would be expected to actually use the area.

APPENDIX B-3-12

Determination of Future Wildlife Habitat Condition

The future wildlife habitat condition was determined by combining the projected vegetative changes (from the Chapter 3 Vegetation section) with the present wildlife habitat condition ratings (Chapter 2 and Appendix B-2-8). Those range write-up types which would have their overall condition ratings improved by an improvement in the species composition column were tabulated at the pasture and allotment level. The species composition and shrub density columns were considered since they were the only data which have been projected to change significantly in the future as a result of the proposed action.

A figure of 5% increased composition in the grass-forb layer over the entire ES area, and a 10% decrease in the shrub cover (as predicted in Chapter 3 Vegetation) in the grass types on the winter ranges was added to the present condition ratings (Appendix B-2-8).

If the predicted changes were great enough to change the overall condition ratings (Appendix B-2-8) of the vegetation write-up types being considered, that type was considered to be changed in the Chapter 3 Analysis.

APPENDIX B-4-1

Effectiveness of Let-Down Fence

Each month's average snow depth from 1950 to 1975 was taken from the Rawlins FAA Airport weather station. The mean and standard deviation was calculated for the 225 months of data (June, July, and August were excluded). All months with average snow depth above two standard deviations was considered significant. The number of significant months when the fence would be down was divided by the total number of significant months. There were 21 significant months, of which 20 occurred between October 1 and May 31 (20 ÷ 21 = 95%). Thus the fence would be down during 95% of the significant months.

APPENDIX B-8-1

Breakdown of AUMs Under the Alternative of Elimination of Livestock Grazing

There are presently 62,625 winter sheep AUMs in the Seven Lakes ES area without livestock suitability considerations.

Pronghorn

Taylor (1975) found that 80,134.4 acres of Wyoming's Red Desert could support 27,060 pronghorn if there were no livestock. Extrapolating his data to the 512,854 acres of the ES area, it would support 16,536 head of pronghorn.

This number of pronghorn would require 6,526 winter sheep AUMs annually

(16,536 head)(12 months)(.098 diet overlap) = 6,526 AUMs

2.98 head per winter sheep AUM

Mule Deer

Under the no livestock grazing alternative, there would be a 10% increase over present populations. Thus, there would be 193 total mule deer in the ES area. Therefore, the winter sheep AUMs required to support these animals would be figured as follows:

(193 mule deer)(12 months)(./£ diet overlap) = 81 AUMs

4 deer per AUM

Eighty-one winter sheep AUMs would be needed.

Wild Horses

Wild horse populations would increase approximately 20% annually in the Seven Lakes ES area, as they do today, until the forage supply was destroyed. Therefore, under the elimination of grazing alternative, a new wild horse plan would be written setting the range of numbers of horses to be managed. Seven hundred wild horses was arbitrarily chosen as the maximum number for the purposes of analysis, although the 1975-1976 Weight Estimate Range Survey found approximately 25,000 horse AUMs in the ES area, indicating that the area can support the 700 easily.

Wild horses on a yearlong basis have a .35 diet similarity with winter sheep (Hansen 1975). Thus, the proposed 700 head would require 2,940 winter sheep AUMs.

(700 head)(12 months)(.35 diet overlay) = 2,940 AUMs

1

The remaining 53,078 winter sheep AUMs would be allocated for other wildlife species, watershed, and visual use.

APPENDIX B-8-3

Methodology Used in Determining Predicted Production in 1998: Alternative 2

In 1962, H. G. Fisser and R. E. Ries initiated rangeland research activities in the semi-arid portion of western Wyoming. The Sweetwater exclosure was constructed in 1959 in the sagebrush-grass vegetation type approximately 8 miles southwest of Jeffrey City, Wyoming. There were two treatments studied; no grazing compared to grazing.

Production inside the exclosure averaged 227.28 pounds per acre since 1965 compared to 180.67 pounds per acre outside the exclosure since 1965. Data is shown on Table B-20.

From 1965 to 1970, production inside the exclosure increased 46.61 pounds per acre compared to outside the exclosure. This represents a 26% increase. Over the long-term time period, an increase in production of 20% would be expected.

Methodology Used in Determining Present Key Species Composition for Alternative 2

In determining the present key species composition for the entire Seven Lakes ES area, a weighted average was used. For example, the methodology used in determining the present composition percentages of *Agropyron dasystachyum* in the sagebrush vegetation type is as follows:

.16 x 24,045 acres = 3,847.2
.08 x 154,086 acres = 12,326.88
16,174.08
16,174.08 ÷ 178,131 acres = .09 = 9%

Methodology Used in Determining Future Key Species Composition in 1998: Alternative 2

The same study described in this appendix for "Methodology Used in Determining Predicted Production in 1998" was used. Basal cover was used to establish a basis for the change in key species composition between 1976 and 1998 (Table B-21).

Basal cover of the key species did not change any significant amount due to grazing or no grazing. The key species composition would also not be expected to change.

TABLE B-20
VEGETATIVE PRODUCTION

Production (lbs/acre) inside exclosure per year*

Grass Species	1965	1966	1967	1968	1969	1970	Total	Average
AGSM	19.20	0.00	4.13	11.62	35.57	15.41	85.93	14.32
CAEL	4.85	0.00	0.00	1.82	10.27	10.85	27.79	4.63
CAFI	18.48	10.80	39.22	34.94	9.36	7.97	120.77	20.13
KOCR	15.89	0.00	57.17	81.41	73.87	38.75	267.09	44.52
ORHY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
POSE	22.61	31.06	19.06	43.77	12.58	4.71	133.79	22.30
STCO	119.61	164.30	192.98	132.43	118.42	65.57	728.31	121.39
PERRENIAL GRASS	200.64	206.16	249.56	305.99	260.07	141.26	1,363.68	227.28

Production (lbs/acre) outside exclosure per year

	1965	1966	1967	1968	1969	1970	Total	Average
AGSM	54.05	0.00	34.08	11.52	13.97	23.82	137.44	22.91
CAEL	24.86	0.00	0.00	15.60	10.46	21.37	72.29	12.05
CAFI	19.58	14.26	53.90	25.82	43.82	32.46	189.84	31.64
KOCR	8.88	0.00	35.14	27.69	27.55	10.85	110.11	18.35
ORHY	0.00	0.00	1.01	0.00	0.00	0.00	1.01	.17
POSE	47.86	37.15	12.24	19.06	8.59	9.84	134.74	22.46
STCO	18.38	121.49	68.45	136.12	49.73	44.37	438.56	73.09
PERRENNIAL GRASS	173.61	172.90	204.82	235.83	154.12	142.71	1,083.99	180.67

*Fisser and Ries (1974).

TABLE B-21
DIFFERENCE IN BASAL COVER BETWEEN GRAZING AND NO GRAZING

Vegetation Type	Inside Exclosure	Outside Exclosure	Difference
Agsm	.29%	.30%	.01%
Orhy	.40%	.01%	.03%
Pose	.53%	1.11%	.58%

APPENDIX B-8-4

Methodology Used in Determining Acreage Disturbed by Range Improvements

The acreage disturbed by the range improvements by allotment was determined by multiplying the acres disturbed per unit (refer to Table 3-1) by the range improvements proposed by allotment (refer to Table 1-11). The computations are shown in Table B-22.

TABLE B-22
ACRES DISTURBED BY IMPROVEMENT BY ALLOTMENT

Ferris							
Type 1 Fence	2.4	miles	x	1.5	acres/mile	=	3.6 acres
Let-down Fence	1.4	miles	x	1.5	acres/mile	=	2.1 acres
Cattleguards	1	unit	x	0		=	0 acres
Water Developments	3	units	x	1.8	acres/unit	=	5.4 acres
Pasture Boundary Signs	8	miles	x	.1	acres/mile	=	.8 acres
Reservoir Repair	1	unit	x	4.0	acres	=	4.0 acres
Reservoir Fencing	.3	miles	x	.06	acres	=	.2 acres
							16.1 acres
Stewart Creek							
Type 1 Fence	8.4	miles	x	1.5	acres/mile	=	12.6 acres
Let-down Fence	17.2	miles	x	1.5	acres/mile	=	25.8 acres
Cattleguard	2	units	x	0		=	0 acres
Water Development	22	units	x	1.8	acres/unit	=	39.6 acres
Pasture Boundary Signs	21	miles	x	.1	acres/mile	=	2.1 acres
Reservoir Fencing	.6	miles	x	.8	acres/mile	=	.5 acres
Pipeline	12	miles	x	.1	acres/mile	=	1.2 acres
							81.8 acres
Cyclone Rim							
Type 1 Fence	5.5	miles	x	1.5	acres/mile	=	8.3 acres
Let-down Fence	9.2	miles	x	1.5	acres/mile	=	13.8 acres
Cattleguard	1	miles	x	0		=	0 acres
Water Developments	10	units	x	1.8	acres/unit	=	18 acres
Spring Development	1	unit	x	2.0	acres/unit	=	2.0 acres
Exclosure Fencing	.45	miles	x	1.5	acres/mile	=	.7 acres
							42.8 acres

APPENDIX B-8-5

Distribution of Federal AUMs Under Alternative 1

The distribution of the livestock grazing the Seven Lakes allotment under this alternative would be assumed to be patterned as follows:

Ten percent of the Seven Lakes licensed cattle use (176 AUMs) would be taken in the area of the proposed Cyclone Rim allotment. Of these AUMs, 106 would be used in the area of the proposed Luman pasture, 53 in the area of the proposed Lost Creek pasture, and 17 in the area of the proposed Cyclone pasture.

Eighty percent of the Seven Lakes licensed winter sheep use (10,410 AUMs) would be taken in the proposed area of the Cyclone Rim allotment, 60% of which would be in the area of the Luman, 30% in the Lost Creek, and 10% in the Cyclone pastures, respectively.

Of the remaining 20% of the Seven Lakes sheep use (2,602 AUMs) which would be taken in the area of the proposed Stewart Creek allotment, 30% would be taken in the area of the proposed Osborn Well pasture and 70% in the area of the proposed Chicken Spring pasture.

All of the licensed summer sheep use (1,446 AUMs) would be taken in the area of the proposed Cyclone pasture.

However, 90% of the cattle use (1,585 AUMs) would be taken in the area of the proposed Stewart Creek allotment. This use would be broken down in the area of the proposed pastures of Sand Springs and Chicken Springs equally (50% + 50%).

In the Ferris allotment, only 41 cattle AUMs would be used in the area of the proposed Bull Springs pasture and 168 in the proposed Lost Soldier Creek pasture area. Sheep use would be spread evenly over the allotment.

APPENDIX B-8-6

Methodology Used in Determining Predicted Production in 1998: Alternative 5

In order to determine the predicted production, the grazing season and class of livestock were considered. The analysis was performed in two parts: (1) the Cyclone Rim allotment, and (2) the Stewart Creek allotment (refer to Chapter 1 for description of these areas).

Cyclone Rim Allotment

Grazing in the northern one-half of the allotment would take place: (1) during the summer period (June 1-August 1), and (2) 50% of the time between October 15 and March 31. Stoddart and Cook (n.d.) reported 29% mortality of plants when grazed for three successive years; therefore 15% mortality of plants would be expected in the northern one-half of the Cyclone Rim allotment.

Grazing during the winter months (October 15-March 31) would not substantially affect the vegetation. Only winter sheep would be allowed to graze in the southern one-half of the Cyclone Rim allotment and only for 50% of the winter months. An approximate 3%-5% increase in production would be expected to occur.

Summary for the Cyclone Rim Allotment

A 10% decrease in production would be expected to occur due to grazing during the winter and late spring months without substantial rest to improve the vegetation.

Stewart Creek Allotment

One-third of the allotment would receive fall grazing (August 1-November 1) only. This would not be beneficial or detrimental to the vegetation (Mueggler n.d.).

Two-thirds of the allotment would receive winter sheep grazing (50% of the time between October 15 and March 31) and summer grazing by cattle (June 1-August 1). This would result in a 15% mortality in the vegetation.

Summary for the Stewart Creek Allotment

The would be an approximate 15% decrease in the production as a result of the grazing season proposed.

The entire Seven Lakes allotment (Cyclone Rim and Stewart Creek allotments combined) would receive a 2 month rest between April 1 and March 31. This would result in an approximate 5% increase in the production of the vegetation.

Summary for Seven Lakes Allotment

An expected 10% decrease in production would occur due to grazing during the winter and summer months without substantial amounts of rest to improve the vigor of the vegetation.

Methodology Used in Predicting Key Species Composition

Sheep prefer the forage produced on shrubby plants more than do cattle and horses. Though sheep eat grass in large quantities, most grasses must be young and green to be fully used (Stoddart, Smith, and Box 1975). Sheep exhibit a seasonal preference for certain forages; and in the late winter period, they are highly selective of the early growing species that are green (Hutchings n.d.). Cook and Stoddart (1963) have shown that the percent of plants killed increased with the increased intensity of herbage removal.

From analysis of the above studies and the types of livestock grazing the Seven Lakes allotment, it is expected that the grass species would receive the heaviest use. These species would receive grazing pressure during the summer by cattle and again in the late winter by sheep. The shrub species would receive their greatest pressure during the summer months and the early winter months by sheep.

The amount of rest a plant would receive would depend on its location within the allotment. The area west of Crooks Gap-Wamsutter Road and south of Township 25 North would receive a rest from April 1-October 14 and 50% of the time between October 15 and March 31.

The vegetation north of Township 25 North and in Ranges 91 West and 92 West would receive a rest from August 1-October 14 and then 50% of the time from October 15-March 31. The vegetation in the entire allotment would receive a 2 month rest from April 1-May 31.

Over the long-term time period and over the entire allotment, the relative percentages of grass and shrub species would remain approximately the same. In some areas, the percentages would decline; but in the other areas, the percent grasses and shrubs would increase.

APPENDIX B-8-7

Methodology Used in Determining the Acreage Within Each Condition Class in 1998: Alternative 1

Under Alternative 1, the trend of the vegetation stated in Chapter 2 would be expected to continue. A condition-trend transect was rated as downward, stable, or upward. The condition-trend transect was located within a vegetation write-up type which was given a condition class rating (i.e., poor, fair, good, and excellent). Each condition-trend transect would receive an equable increase or decrease of the change in trend listed in Chapter 2. The percentage change for each condition-trend transect was converted to acreage and added or subtracted from the appropriate column.

Example:

Condition-trend transect CT-6 is listed as upward in trend in the Sand Springs pasture. It is located in vegetation write-up type PJ-2 and is in good condition. Condition-trend transect CT-48 is also in the Sand Springs pasture in an upward trend. It is located in vegetation write-up type NRM-406 which is in fair condition.

Over the entire ES area, 8% of the condition-trend transects are improving. Two of the four condition-trend transects are in the Sand Springs pasture; therefore, 50% (4% of the total 8% in upward trend) of the upward trend is occurring in the Sand Springs pasture. Condition-trend transects 6 and 48 are in good and fair condition, respectively; therefore 2% of the acreage in each condition class would advance to the next highest condition class.

Nine thousand eight hundred and eighty five acres in fair condition x 2% = 198 acres advance to good condition leaving 9,687 acres in fair condition for the Sand Springs pasture.

Twenty four thousand one hundred and eighty nine acres in good condition x 2% = 484 acres advancing to excellent condition, leaving 23,705 acres in good condition.

Twenty three thousand seven hundred and five acres in good condition plus the 198 acres advancing from fair condition equals 23,903 acres in good condition in 1998.

Three thousand eight hundred and twelve acres in excellent condition plus 484 acres advancing from good condition equals 4,296 acres in excellent condition in 1998.

GLOSSARY

ACTIVE USE Grazing privileges which have been paid for and are presently being used. Active use combined with nonuse equals total auntorized livestock use. Active use normally is descriptive of federal grazing privileges.

ADJUDICATED GRAZING PRIVILEGES That amount of forage production on a particular unit of federal range that is apportioned to range users following a formal process that includes application by the users for grazing privileges, determination of the qualifications for grazing privileges of the applicants, apportionment among applicants of the forage production within the proper grazing season and capacity of that unit of federal range, and acceptance by the applicants of the grazing privileges based upon the apportionment or its substantiation in a decision by an examiner or the Board of Land Appeals upon appeal.

ADVERSE VISUAL IMPACT Any impact on the vegetation, land form, or any introduction of a structure which interrupts or adversely changes the visual character of the landscape and disrupts the harmony of the natural elements.

AESTHETICS Dealings with the nature of the beautiful and with judgements concerning beauty.

ALLOTMENT MANAGEMENT PLAN (AMP) A specific plan for a given area (allotment) which uses a system of livestock use to achieve set vegetative, watershed, soil, wildlife habitat and/or recreational objectives.

ANIMAL UNIT Considered to be one mature (1,000 lb.) cow or equivalent based upon average daily forage consumption of 26 lbs. dry matter per day.

ANIMAL UNIT MONTH (AUM) (1) The amount of feed or forage required by an animal unit for one month. (2) Tenure of one animal-unit for a period of one month.

APICAL DOMINANCE Suppression of the growth of buds located at the tips of branches and in the leaf axils of young stems by hormones when the apical bud is present.

AQUIFER A water bearing formation.

ARTESIAN FLOW A well which taps a source of groundwater under enough pressure to push the water to the surface without pumping.

CAIRN A rounded or pyramidal heap of stones made as a monument or memorial or as a landmark or trail marker.

CHARACTERISTIC LANDSCAPE The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to a farming community, an urban landscape or an undisturbed natural environment.

CLASS III CULTURAL INVENTORY An intensive on-the-ground cultural survey covering 100% of a given area. Such an inventory is designed to locate all surface evidence of cultural sites, as well as to identify areas with a high potential for buried resources.

CLIMAX The highest ecological development of a plant community capable of perpetuation under the precailing climatic and edaphic conditions.

COMPLIANCE STATEMENT 106/2(b) Under the Historic Preservation Act of 1966, the Advisory Council on Historic Preservation must be given an opportunity to comment with regard to any action which may affect any site on or eligible for inclusion on the National Register. If the undertaking causes a change in the quality of the character of the site, then the Advisory Council and State Liaison Officer would consult with the agency to wither remove or mitigate the effect. Also referred to as 106 Statement.

CONTRAST The effect of a striking difference in the form, line, color, or texture of an area being reviewed.

CONTRAST RATING A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature.

CULTURE AREAS Geographical regions where a similarity of cultural forms of the occupants of a region are found through ethnographic and archeological studies.

EPHEMERAL STREAM A stream which only flows for a short time each year, as in response to snowmelt or rainstorms.

ETHNOGRAPHIC Relating to the division of mankind into races, distribution, etc.

EXCHANGE-OF-USE An agreement between the Bureau of Land Management and an applicant having ownership or control of non-federal land which is interspersed and normally grazed in conjunction with the surrounding federal range. The applicant would be allowed to graze the non-federal land without payment provided that during the length of the agreement the Bureau has control and management of the non-federal land for grazing purposes. An exchange-of-use agreement is valid only when the non-federal land offered for exchange-of-use is located within the federal grazing allotment for which the exchange is sought.

FACIES The sedimentological record of a depositional environment.

FECAL COLIFORMS An organism that is used as an indication of the possible presence of warm-blooded pathogens.

FORM The mass of an object or objects that appear unified.

HEAVY GRAZING A comparative term which indicates tjat tje stocking rate of a pasture is relatively greater than that of other pastures.

HYDROLOGIC SOIL-COVER COMPLEX A rating determined by the hydrologic characteristics of a soil and the type and amount of vegetative cover.

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HYDROLOGIC SOIL-COVER COMPLEX A rating determined by the hydrologic characteristics of a soil and the type and amount of vegetative cover.

HYMO A computer model that computes runoff and soil loss from precipitation and characteristics.

INCOMMON ALLOTMENT A grazing allotment which has several livestock operators and in which more than one class of livestock is authorized to graze. The word "incommon" is part of the official name of both the existing Seven Lakes incommon and the Ferris incommon allotment.

INFILTRATION The entry of water into the surface layer of soil.

INTERMITTENT STREAM A stream which flows only during the wet season.

INVADER Plant species that were absent or present in very small amounts in undisturbed portions of the original vegetation of a specific range site and will invade following disturbance or continued overuse.

JACKSON TURBIDITY UNIT (JTU) An expression of the turbidity of water as determined by optical techniques.

KEY AREA A portion of range, which, because of its location, grazing, or browsing value, and/or use, serves as an indicative sample of range conditions, trend, or degree of seasonal use.

KEY MANAGEMENT SPECIES Forage species on which management of grazing of a specific unit is based. Also called key species.

LANDSCAPE CHARACTER The arrangement of a particular landscape as formed by the variety and intensity of the four basic elements of form, line, color, and texture.

LICENSED USE The combined authorized active and nonuse grazing use of federal grazing by a livestock operator. This does not include unauthorized (trespass) use.

LIGHT GRAZING A comparative term which indicates that the stocking rate of one pasture is relatively less than that of other pastures.

LITHOLOGIC Relating to rock type.

MAGNITUDE OF CONTRAST A classification of intrusions as to the degree which they have modified or intruded upon the natural landscape.

MODERATE GRAZING A comparative term which indicates that the stocking rate of a pasture is between the rates of other pastures.

NATURALISTIC CHARACTER OR LANDSCAPE A landscape situation where the basic elements (form, line, color, and texture) are displayed in a composition that appears natural within the surrounding area or character type.

NONUSE Grazing privileges which are not presently being used. The nonuse combined with the active use (see active use) equals the total authorized livestock use. Nonuse normally is descriptive of federal grazing privileges.

POLYNOLOGICAL PROFILE Core samples taken serve to determine the past climate of an archeological site from the paleopollen present in the soil. Several samples are taken from a site in a vertical profile.

PERCENT LICENSE The Bureau of Land Management has the authority to administer federal land only (a few exceptions can be found when agreements are made). Fees are only charged for grazing use on federal range. The percent federal range in a certain area is used to compute the grazing fee.

PERENNIAL STREAM A stream which flows throughout the year.

POTENTIAL EVAPORATION The amount of water that would evaporate if water was not limited.

PROJECTILE POINT A dart, spear or arrow point.

PROPER USE FACTOR (PUF) A degree and time of use of current year's growth which, if continued, will either maintain or improve the range condition consistent with conservation of other natural resources.

QUALIFICATIONS The total number of AUMs a livestock operator would be authorized to use annually on public land. Sometimes a portion of an operator's qualifications can be placed in a category of suspended nonuse usually because of diminished grazing capacity in an area or for reasons of repeated trespass actions.

RADIOCARBON DATES Measurements of the age of archeological material determined by the Carbon 14 content found in organic matter.

RANGE CONDITION The present state of vegetation on a range site in relation to the climax (natural potential) plant community for that site.

RECREATION RESOURCES Any natural resource or feature that contributes to outdoor leisure pursuits or experiences.

SCENIC QUALITY The quality of the scenery as determined through the use of the scenic evaluation process.

SENSITTIVITY LEVEL (S) An index of the relative importance or value of visual response to an area in relation to other areas in the planning unit.

SPECIFIC CONDUCTANCE The conductivity of water as expressed by micromhos per square centimeter at 25° C. Specific conductance is the indicator of the level of total dissolved solids.

SOIL SURFACE FACTOR (SSF) A number from 1 to 100 that indicates the erodibility of a site. The number is derived by rating, during a field examination, such on-site factors as soil movement, surface litter, surface rock, pedestalling, flow patterns, rills, and gullies. The numerical rating assigned to each factor is added to give the erosion condition class. A rating of 0-20 indicates a stable site; 21-40, slight erosion; 41-60, moderate erosion; 61-80, critical erosion; and 81-100, severe erosion.

STREAM POWER Energy of a stream defined as the cross-product of the energy, slope, velocity, depth and unit weight of water.

STORM RUNOFF Runoff which occurs in response to rainfall. A 10-year storm runoff is one expected to occur on the average once every 10 years.

SUBLIMATION The direct vaporization of ice without passing through the liquid state.

TOTAL DISSOLVED SOLIDS The total content of salts in solution in water, indicated in milligrams per liter.

VISUAL MANAGEMENT UNIT An area of land where there is no variation in the visual zone, sensitivity zone, and scenic quality zone.

VISUAL RESOURCE The land, water, vegetation, animals, and other features that are visible on all public lands.

VISUAL RESOURCE MANAGEMENT CLASS (VRM) The degree of alteration that is acceptable within the characteristic landscape. It is based upon the physical and sociological characteristics of any given homogeneous area.

VISUAL ZONES The area that can be seen as foreground, middleground, background, or seldom seen.

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